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REGISTER

OF THE

UNIVERSITY OF ARIZONA

FIFTEENTH YEAR

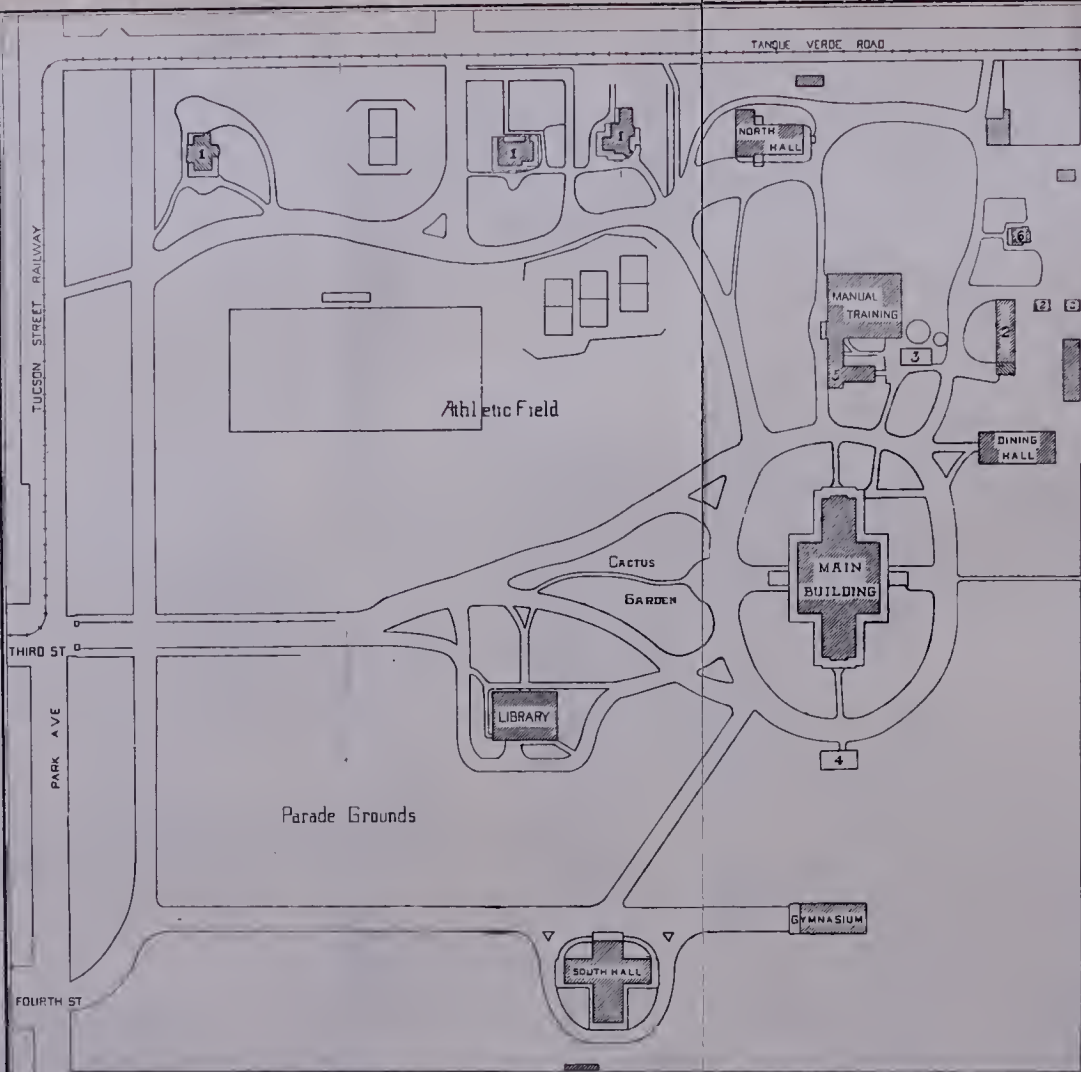
1905-1906

ANNOUNCEMENTS

1906-1907

Tucson, Arizona

1906



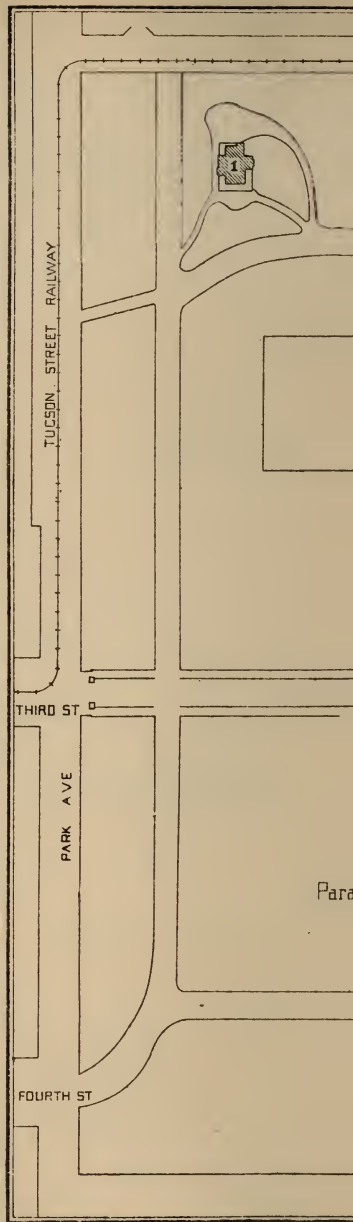
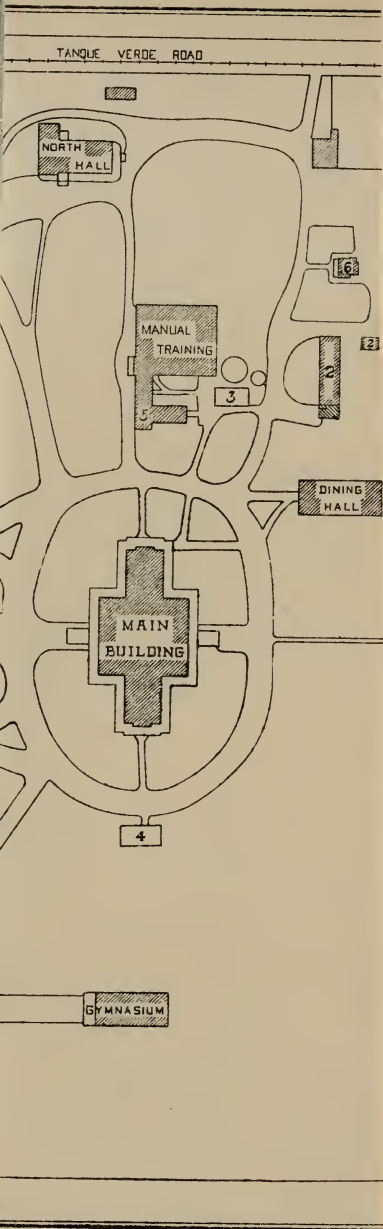
- LEGEND—
- 1 COTTAGES
 - 2 GREEN HOUSES
 - 3 POWER HOUSE
 - 4 METEOROLOGICAL STA
 - 5 ASSAY DEPT
 - 6 DOMESTIC SCIENCE COTTAGE

Map of the
Campus
UNIVERSITY
 OF
ARIZONA.

TUCSON A.T.

Student Surveys
 Scale

240 Feet to 1 Inch.



REGISTER

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UNIVERSITY OF ARIZONA

FIFTEENTH YEAR

1905-1906

ANNOUNCEMENTS

1906-1907

TUCSON, ARIZONA

F. E. A. KIMBALL, Printer &

1906
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CALENDAR.

1906.

Sept. 13, Thursday . .	}	Entrance Examinations.
Sept. 14, Friday . .		
Sept. 17, Monday . .		Registration Day.
Sept. 18, Tuesday . .		First Semester begins.
Nov. 28, Wednesday . .		Thanksgiving Recess begins
Dec. 3, Monday . .		Instruction resumed
Dec. 22, Saturday . .		Holiday Recess begins.

1907.

Jan. 2, Wednesday . .		Instruction resumed.
Jan. 31, Thursday . .		First Semester ends.
Feb. 1, Friday . .		Arbor Day: Anniversary of the University.
Feb. 4, Monday . .		Second Semester begins.
June 2, Sunday . .		Baccalaureate Discourse.
June 3, Monday . .		Exhibition Military Dept.
June 4, Tuesday . .		Exhibition Mechanic Arts Department.
June 5, Wednesday . .		Commencement.

BOARD OF REGENTS.

Ex-Officio.

HON. JOSEPH H. KIBBEY Phoenix
Governor of the Territory.

HON. R. L. LONG Phoenix
Superintendent of Public Instruction.

Appointed by the Governor.

WALTER TALBOT, *Chancellor* Phoenix

GEORGE J. ROSKRUGE, *Secretary* Tucson

MERRILL P. FREEMAN, *Treasurer* Tucson

CHARLES H. BAYLESS, A. M., Tucson

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WITHDRAWN
285849
112102

FACULTY.

KENDRIC CHARLES BABCOCK, Ph. D.

B. L., 1889, Minnesota; A. M., 1895, Harvard; Ph. D., 1896, Harvard.

President; Professor of History. 1903.*

WILLIAM PHIPPS BLAKE, A. M.

Ph. B., 1852, Yale; A. M., Dartmouth.

Professor of Geology, Emeritus. 1895.

ROBERT HUMPHREY FORBES, M. S.

B. S., 1892. M. S., 1895, University of Illinois.

Director and Chemist Agricultural Experiment
Station. 1894.

FRANK NELSON GUILD, M. S.

B. S., 1894, M. S., 1903, Vermont.

Professor of Chemistry and Mineralogy. 1897.

DAVID HULL HOLMES, B. S.

1892-1894, Washington University; B. S. as of 1901, Arizona.

Professor of Mechanic Arts and Drawing. 1898.

GEORGE EDSON PHILIP SMITH, C. E.

B. S. 1897, C. E., 1899, Vermont.

Professor of Civil Engineering and Physics. 1900.

JOHN JAMES THORNBURGH, A. M.

B. S., South Dakota [Agricultural]; B. S., 1897, A. M. 1901, Nebraska.

Professor of Biology; Botanist, Agricultural Ex-
periment Station. 1901.

IVAN DELASHMUTT, B. S.

B. S., 1901, California.

Professor of Metallurgy. 1904.

VINTON A. CLARK, B. S.

B. S., 1898, Vermont.

Professor of Agriculture and Horticulture, Agri-
cultural Experiment Station. [Residence,
Phoenix.] 1904.

SAMUEL VICTOR McCLURE

First Lieutenant, U. S. A., 1896, West Point.

Professor of Military Science and Tactics. 1904.

* Dates following titles indicate appointment to service in the Uni-
versity.

EDWIN MORTIMER BLAKE, Ph. D.

Mining Engineer, 1890; Ph. D., 1893, Columbia.

Professor of Mathematics and Mechanics. 1904.

SIDNEY CARLETON NEWSOM, A. M.

A. B., 1895, Harvard; A. M., 1898, Chicago.

Professor of English. 1904.

CYRUS FISHER TOLMAN, Jr., B. S.

B. S., 1896, Chicago.

Professor of Geology. 1905.

ALBERT EARLE VINSON, Ph. D.

B. S., 1901, Ohio [State]; Ph. D., 1905, Goettingen.

Associate Chemist, Agricultural Experiment Station. 1905.

CHARLES ALFRED TURRELL, A. M.

B. S., 1896, Nebraska; A. M., 1901, Missouri.

Assistant Professor of Modern Languages. 1904.

WILLIAM WHEELER HENLEY, A. B.

A. B., 1905, Leland Stanford, Jr.

Assistant Professor of Mechanic Arts. 1905 [Dec.].

MARION CUMMINGS STANLEY, B. L.*

B. L., 1900, California.

Instructor in Latin and Philosophy. 1902.

GLENN A. WILCOX, B. S.

B. S., 1893, Cornell.

Instructor in Science. 1904.

WILLIAM M. RUTHRAUFF, A. M.

A. B., 1902, A. M., 1905, Wittenberg.

Instructor in Economics and History. 1904.

ESTELLE G. LUTRELL, A. B.

A. B., 1896, Chicago.

Instructor in English; Librarian. 1904.

FREDERICK EDWIN TALMAGE, B. S.

B. S., 1903, California.

Instructor in Stenography and Book-keeping. 1904.

* On leave of absence, February to September, 1906.

LEVONA PAYNE NEWSOM, Ph. D.

A. B., 1892, Ph. D., 1895, Franklin.

Instructor in Latin. 1905.

WILLIAM GEORGE MEDCRAFT, A. M.

A. B., 1898. A. M., 1904, Kansas Wesleyan.

Instructor in Mathematics. 1905.

A. MAY ASHWORTH, A. B.

A. B., 1901, Smith.

Instructor in English. 1905.

PAUL MURRAY, A. B.

A. B., 1905, Butler.

Instructor in Physical Training. 1905.

JOSEPH CONRAD HOLTY, M. S.

B. S., 1903, M. S., 1905, Wisconsin.

Instructor in Chemistry. 1905.

ALICE M. SPITLER, B. S.*

B. S., 1905, Ohio [State]

Instructor in Domestic Science. 1905 [Oct.].

CLARENCE ERROL FERREE, M. S.

B. S., 1900; A. M., 1901; M. S., 1902, Ohio Wesleyan.

Instructor in Philosophy and Science. 1906 [Feb.].

OTHER OFFICERS.

FREDERICK EDWIN TALMAGE, B. S.

Secretary to the President. 1904.

HERBERT BROWN,

Curator Territorial Museum.

MRS. CORNELIA M. STEWART,

Preceptress of Young Women. 1903.

MRS. MARY HENRY AITON, M. D.

M. D. Northwestern.

Medical Examiner for Women. 1905.

ARTHUR W. OLCOTT, M. D.

A. B., 1884, Princeton; M. D., 1887, St. Louis.

Medical Examiner for Men. 1905.

* Resigned February 1, 1905.

WILLIAM GEORGE MEDCRAFT, A. M.

Head of Men's Dormitory. 1905.

WALTER HAROLD MUELLER

Secretary to the Director of the Agricultural Experiment Station.

ROBERT A. HARRIS,

Superintendent of Buildings and Machinery. 1904.

ROY GIBBONS MEAD,

Commercial Assayer. 1905.

STUDENT ASSISTANTS.

[Service not continuous through the year in every case.]

Rollin H. Holbrook

Burrell A. Hatcher

Walter Mellgren

J. Wesley Gebb

Montrose L. Lee

Fred. Barthels

Raymond A. Newton

Rollin Brown

Charles A. Firth

Ralph N. Harwick

William F. Drew

Joel Elmer Johnson

George E. Kohler

Charles E. Wooddell

Perry Thompson

Lawrence Calloway.

Andrew A. Kuster

Sidney F. Mashbir

Frances M. Babcock

Mabel Wilkerson

Felicia Smith

Lillian Cook

Idora Hadsell

STANDING COMMITTEES.

1905-1906.

The President is ex-officio member of all committees.

Executive.

Professors Forbes, Holmes, E. M. Blake.

Registration and Classification.

Professors Guild, Smith, Newsom, DeLashmutt.

Library.

Professors Guild, Smith, Turrell, Miss Lutrell.

Printing and Publication.

Professors Forbes, Newsom, Mr. Talmage.

Athletics.

Professors Smith, Thornber, Mr. Ruthrauff, Mr. Murray.

Public Exercises.

Professors E. M. Blake, Holmes, Mrs. Stanley.

Intercollegiate Debate.

Professors Thornber, Newsom, Mr. Ruthrauff.

Manual Training.

Professors Holmes, Smith, E. M. Blake.

Co-Operative Association.

Professor Holmes, Mr. Talmage, Ruthrauff.

Sub-Collegiate Department.

Professor Newsom, Mr. Wilcox, Mr. Medcraft, Miss Ashworth.

Rhodes Scholarship.

President Babcock, Professors Newsom, Guild.

UNIVERSITY OF ARIZONA

**Established By Act of the Legislative Assembly, 1885;
Opened to Students, October, 1891.**

PURPOSE AND ORGANIZATION.

The University of Arizona is a part of the system of public education established for the Territory, and aims, as head of such system, to fill the same position as that occupied in the States by the State Universities. In general, the organization of the University is in accordance with the Morrill Act of 1862, creating the Land Grant Colleges. The United States has already set apart fifty-seven sections of valuable public land in the northern timber belt, to which the University will receive full title upon the admission of the Territory into the Union. In creating the University, the Legislative Assembly wisely unified under one management the various schools and institutions of higher learning or investigation, which in some States and Territories have been widely and completely separated—the colleges of liberal culture, the schools of Mines and Engineering, the Agricultural College, and the Agricultural Experiment Station. No professional schools of law, medicine, arts or music have yet been organized. On the other hand, while the high schools of the Territory are in the formative period, the desire to make the University serviceable to all, has led to the establishment and maintenance of a sub-collegiate department.

The purpose of the University of Arizona is, in the language of the organic law, "to provide the inhabitants

of this Territory with the means of acquiring a thorough knowledge of the various branches of literature, science and the arts;" and so far as possible a technical education adapted to the development of the peculiar resources of Arizona. In furtherance of this latter purpose, instruction is provided especially in subjects fundamental to agriculture, in the mechanic arts, and in mining and metallurgy. The University, by the nature of its situation, frankly lays its strongest emphasis upon the course in mining engineering. It is, in reality, in a great mining laboratory surrounded as it is on all sides by great mines. Some of these mines developed on a large scale are within a few miles of the city and the number and magnitude of such enterprises is steadily increasing. Probably no University in the United States offers such fine advantages to the students of mining engineering who desire to see the actual operation of great mines, or the development of new enterprises, while carrying on the theoretical and experimental work of the mining course.

The Agricultural Experiment Station, a department of the University, is engaged wholly in investigating and developing the agricultural resources of the Territory.

The government of the University is vested in a corporation styled The Board of Regents of the University of Arizona, consisting of the Governor of the Territory and the Superintendent of Public Instruction, ex-officio, and four other members appointed by the Governor.

LOCATION AND CLIMATE.

The University of Arizona is located at Tucson, a city of twelve thousand inhabitants, on the main line of

the Southern Pacific railway, 312 miles west of El Paso, Texas, and 500 miles east of Los Angeles, Cal. The city lies in a broad, flat valley at an elevation of 2,400 feet above sea level and is surrounded by mountains. Its dry, mild, and equable climate has made Tucson a famous winter resort unsurpassed for healthfulness.

The winter climate is especially good; the temperature is cool and strengthening but not severe, the lowest temperature recorded during the average year being about twenty degrees above zero, Fahrenheit. Little rain falls during the winter; fogs are all but unknown; cloudy days are rare. The percentage of sunshine throughout the winter is greater than that recorded at any other place in the United States. Owing to the extreme dryness of the air the highest temperatures known are less oppressive to the senses and less dangerous to the health than the summer heats of the upper Mississippi Valley States. The total amount of rainfall averages less than twelve inches.

The University Campus, consisting of fifty-five acres, is situated upon high ground about a mile from the business center of the city with which it is connected by a street-car line. On every side it commands a view of mountain scenery of remarkable extent and grandeur. The buildings are lighted by electricity furnished by the city plant.

An abundant supply of unusually good water for household, laboratory and irrigation purposes is drawn from a large well on the Campus from a depth of one hundred and twenty feet.

The grounds have been carefully laid out in drives, lawns and gardens. A large number of palm, olive,

umbrella, ash, pepper, bagota and cottonwood trees give the Campus quite the air of a well kept park.

BUILDINGS.

The main building, University Hall, is 200 x 150 feet, two stories in height, the first story of gray stone, the second of red brick. It is completely surrounded by a wide two-story veranda. The building contains recitation rooms, laboratories and apparatus rooms of the various departments, an assembly room, and the office and library of the Experiment Station.

The Library and Museum building, costing about \$32,000 including furnishings, was occupied in January, 1905. It is a handsome red brick and Bedford sandstone building, with a massive tile roof. The interior finish is in natural oak and pine. The offices of the President and Secretary of the University, three lecture rooms for the departments of geology, mathematics, English and history, work rooms for the library and museum, and a laboratory for the department of geology, are on the first floor. The Library reading room is on the second floor, a large, well-lighted room, beautifully furnished with heavy solid oak reading tables, desks, and wall cases. The stack-room at the rear is fitted up with the most modern steel stacks. The Museum occupies part of the first floor and the west half of the second floor. Large additions in the shape of new oak and plate-glass cases have been made to the furnishings.

North Hall, a dormitory two stories in height built of gray stone of fine quality, is occupied by the young women. Besides the parlor and rooms of the preceptress, it contains sixteen rooms, each large enough to

accommodate two students. During the summer of 1905 the building was re-furnished by means of money appropriated by the Legislative Assembly.

South Hall, a large brick building containing forty rooms, besides bath and toilet rooms, is the men's dormitory, capable of accommodating seventy-five students.

The Dining Hall, built of red brick, provides ample boarding accommodation for all persons living on the Campus.

The Shop and Assay building is a large, substantial brick structure. It contains a commodious drawing room for mechanical and free-hand drawing, a large laboratory for forge work, machine practice and carpentry. Two other rooms are used for lockers, and for the motor and engine. The commercial assaying department occupies a number of rooms fully equipped with a large melting furnace, the necessary muffle furnaces, and other accessories for making complete and accurate assays.

The Mill or Mining Machinery building located to the northeast of the main group of buildings, is a plain, wooden structure in which are placed the stamp-mills, jigs, concentrating tables, separators, etc., necessary for the mining laboratory.

Herring Hall, the Gymnasium, is a very substantial high building 40x80 feet, constructed of red brick and white plaster. It was erected in 1903, the gift of Professor James Douglas and his associates of the Copper Queen Consolidated Mining Company, through Colonel William Herring, after whom it was named.

The Pump House and mechanical engineering laboratory replaces the old wooden building which housed the pump and boiler. It was built during the summer of

1905 with funds appropriated by the Legislative Assembly. By the use of brick, cement and iron it is practically fire proof, thus insuring safety to the well and pumps supplying the University with water for all its uses.

Other buildings are the cottage occupied by the department of domestic science, three green houses, a brick barn, and various smaller out-buildings used for shops and store room.

MAINTENANCE.

The University is supported by funds supplied by the United States Government and the Territory of Arizona. By the provisions of the Morrill Act of 1890, the University receives annually from the United States the sum of \$25,000 for the College of Agriculture and Mechanic Arts, established in accordance with the Act of July 2, 1862. For the support of the Agricultural Experiment Station the University receives from the same source an annual appropriation of \$15,000 by the Act of Congress of 1887, known as the Hatch Act; and \$5,000 (for 1906-7, with an annual increase of \$2,000) by the Adams Act of 1906. The Territory of Arizona provides the proceeds of a 3-5 mill tax on the assessed valuation of property of the Territory, which in 1905 amounted in round numbers to \$27,000. Besides these sums, the University receives from year to year by special grants of the Territorial Legislative Assembly, appropriations for specific purposes. \$20,000 was thus voted for the years 1905 and 1906, to be devoted to minor buildings, improvements, repairs, publications, etc.

EQUIPMENT.

LIBRARY.

The library, containing 11,000 bound volumes and 12,000 pamphlets, is open to the use of all students. Of these volumes a collection of complete sets of scientific and literary periodicals, to which additions are being made yearly, is of special service in reference work.

The books are classed by the decimal system and shelved in numeric order with a further author division according to the Cutter numbers. The catalogue is the usual dictionary card catalogue of authors, subjects and titles in one alphabetical arrangement. Library of Congress cards are used whenever obtainable. The Reading Room is supplied with books of general reference which may be consulted by the students without any formality. A representative selection of the popular current periodicals is also placed here together with the weekly Territorial and local daily newspapers.

The Carnegie Library of the city of Tucson is also open to the use of the students of the University. This library is the depository of United States Government documents for the Territory of Arizona.

MUSEUM.

The Seventeenth Legislative Assembly of Arizona passed an act establishing a general museum at the University. The object of the museum is to collect materials of all kinds illustrating the resources and development of Arizona, and particularly to preserve historical relics, including those pertaining to the aboriginal inhabitants. Donations of specimens and collections will be received and acknowledged with thanks, but no special provision

has yet been made by the Legislature for the support of this department, aside from a small appropriation for the salary of a curator.

The professors of the University have the immediate care of the collections pertaining to their respective departments. The collections now displayed at the University comprise representative series of minerals, ores and rocks of Arizona. Among these may be particularly mentioned superb specimens from the mines of the Copper Queen at Bisbee. There are also collections of typical rocks and minerals for comparison, and many specimens of ores from different parts of the United States and from abroad. It is desired to make the collection of ores and minerals fully represent the great mineral resources of Arizona.

A large amount has been recently spent upon new cases for the Museum in its new quarters and the material thus re-arranged and displayed in good light becomes doubly attractive and useful.

The museum is indebted to Mr. Herbert Brown, curator, for a large and valuable collection of skins of the birds of Arizona, which he has deposited in the museum, as well as for a collection of ancient aboriginal pottery and other relics. The fossil skull and teeth of an elephant and other fragmentary remains of extinct animals sent from Yuma by Mr. Brown also deserve special mention.

Historical records of much value are gradually accumulating as a part of this museum, and an appeal is made to old settlers and others to bear this fact in mind when making disposition of articles bearing even remote relation to the early pioneers of their history. All

records and data of any nature that can be gleaned are worthy of preservation, and it is earnestly desired to have them placed at the University, where they will always be accessible for reference.

BIOLOGY.

The biological laboratories are located on the second floor of University Hall. They are convenient and well-lighted and the equipment is such as is required for modern instruction and research in the biological sciences. The library and apparatus are well selected and adapted to the region and the courses offered.

The collections possessed by this department form a very important part of its equipment. The herbarium consists of 12,000 sheets of mounted plants of which number 2,500 are included in the University botanical survey herbarium. The unique flora and fauna of the mountain, mesa and lowland collecting grounds in close proximity to the institution offer very attractive opportunities for instruction and research especially along ecological lines. The Desert Botanical Laboratory of the Carnegie Institution supplements in most admirable fashion the facilities of the University for investigation.

In addition to the above there are fifty cases of insects, a large case of seeds, articulate and disarticulate human skeletons, plaster and papier-maché models of the important structures of the human anatomy, and duplicate material for study and dissection.

CHEMISTRY.

The chemical laboratories used for instruction are three in number. That used by beginners in the study of general chemistry and qualitative analysis is on the

second floor of University Hall and is equipped for the experimental and theoretical study of chemical science.

The laboratory for qualitative analysis is on the first floor of University Hall. It is thoroughly equipped for the teaching of volumetric and gasometric analysis, blow-pipe analysis, metallurgical chemistry, and wet and fire assaying, including apparatus for the electrolytic determination of metals.

The balance room contains analytical and bullion balances of the latest model so arranged as to insure a maximum of stability and accuracy. A lecture and demonstration room fitted with sinks, cabinets, etc., completes an equipment of apparatus and collections adequate for first-class instruction in both theoretical and practical chemistry.

The laboratories of the Agricultural Experiment Station occupy three rooms on the first floor. These are devoted to analytical work and chemical investigations relating to agriculture. Though not intended for the use of students they are of incidental value to the instructors and students through the investigations which are here conducted.

The laboratory for quantitative analysis is used for determinative mineralogy and blow-pipe analysis. The laboratory is supplied with necessary apparatus for student work including glass and wooden models for the study of crystallography, hand and reflecting goniometers for the measurement of the angles of crystals, a polariscope for the study of optical properties of minerals, and a type set of 600 minerals. Three large cabinets of specimen rocks and 500 microscopic sections of rocks have been recently added to the working collections.

PHYSICS.

Three rooms on the first floor of University Hall are set apart for the teaching of physics. The facilities for experimental demonstration of all important phenomena are very complete. The lecture room is fitted with shutters so that it can be darkened. A beam of sunlight directed by a fine clock heliostat outside may be thrown steadily across the lecture table for experiments on light, or used in connection with the solar lantern for a variety of other work. Adjacent to the lecture room are the laboratory and the apparatus room. Both lecture room and laboratory are supplied with water and gas.

An eight-inch Willyoung induction coil with storage and X-ray accessories is used in the study of high-tension electricity. Through the generosity of the Honorable Mark J. Egan, of Clifton, the University added to its equipment for the study of electricity a fine imported set of miniature wireless telegraphy apparatus, capable of transmitting messages about two hundred feet.

This department also has a double dissolving arc-light Ideal stereopticon, which is used by various other departments of the University and for public lectures before the students.

MATHEMATICS.

Models are an important aid to the study of mathematics. The collection of the department includes thread models of about forty ruled surfaces of the third, fourth and sixth orders. These illustrate the theory of surfaces and are also valuable in the study of kinematics and linkages.

The Bulletin and Transactions of the American Mathematical Society, and the Encyklopedia der Mathe-

matischen Wissenschaften are subscribed for by the University Library.

MINING ENGINEERING AND METALLURGY.

The Mill or mining engineering and metallurgical laboratory is equipped for use by the students of metallurgy in connection with their work in testing ores as to their adaptability for treatment by different processes both on a large and small scale. The chief features of the equipment are one Fraser & Chalmers five-stamp mill, with 900 lbs. stamps; one Fraser & Chalmers three-stamp mill, with 250 lbs. stamps; one 7x10 Blake crusher, one pair of Cornish rolls; one new 16ft. Wilfley table of the latest design; three amalgamating pans; and a new thirty-horse power, "type C," Westinghouse motor.

There are also automatic samplers, elevators, trommels, two small cyanide plants, amalgamated plates, percolaters for leaching tests, etc. A complete assay and chemical outfit supplements these so that the student is able to make the necessary determinations on the spot.

The assay laboratory is equipped with assay furnaces for crucible work, for scorifying and cupeling, and for retorting mercury from amalgam, besides all needed appliances for assaying by dry and wet method including electrolysis. The laboratory also has desks and fittings for the chemical work required in the metallurgical and mineralogical investigation and analysis of ores, in mineral fertilizers, and in qualitative tests of minerals.

CIVIL ENGINEERING.

The apparatus in this department has been chosen with a view of giving the student the greatest familiarity

with the theory, construction and use of those instruments and machines which observation has shown to be of universal adoption in practical civil engineering work and the allied lines in hydraulic and mining engineering. This apparatus embraces surveyors' and engineers' chains, standard field and pocket tapes; plain solar compasses and transits, mining transits; engineers' levels; stadia, level and transit rods; aneroid barometers; odometers, automatic water-registers, hook-gauges; three forms of current meter; stop watch; meteorological instruments; drafting instruments; mechanical calculators, blue-print apparatus; a four and one-fourth inch astronomical telescope with equatorial mountings and accessories; celestial sphere; planimeter; a complete set of apparatus for testing cement; and an Olsen universal testing machine of 100,000 pounds capacity.

MECHANICAL ENGINEERING.

This department has a drafting and recitation room in addition to the regular drawing rooms of the department of Mechanic Arts. In this room is the catalogue file containing the trade literature of about five hundred leading machinery manufacturers of the United States; the collection of working drawings consisting of over three hundred blue prints; and the sample collection of models, machine parts, valves, electric fittings, insulating materials, abrasives, etc.

The Mechanical and Electrical Laboratory, which occupies a large room in the new Pump House, is equipped for the study and operation of boilers, steam and gasoline engines, hydraulic and electrical machinery. Besides the machinery of the shop and the mill which can

be used for experimental purposes and for study of machine design, the University has a 60 H. P. tubular boiler, 35 H. P. Atlas engine, a duplex feed pump, a Cameron pump, a 3 H. P. and a 1-2 H. P. direct current electric motor, an injector, a 500 gallon fire pump and a 40 H. P. Fairbanks-Morse gasoline engine. A 300 gallon two-stage centrifugal pump and its electric motor in the University well serve as part of the equipment for mechanical engineering.

MECHANIC ARTS.

The Mechanic Arts building provided largely through the generosity of the Copper Queen Consolidated Mining Company, has a total floor area of 7,900 square feet divided as follows: Power room and draughting room each 1,200 square feet; wood-working shop, forge shop and machine shop, each 1,400 square feet; wash room, 600; model room 400, and store room 300 square feet.

The entire building is well ventilated and lighted from above as well as from the sides. The drafting room is heated by steam.

The wood shop is equipped with a full assortment of hand tools, six turning lathes, a universal wood-working machine, a Whitney dimension sawing machine, a band saw, a universal trimmer and a large grindstone with truing devise.

The forge room contains twenty-four down-drought forges, twenty-four anvils, a combination shear and punch, a blacksmith's drill press and a full assortment of small tools and appliances.

The machine shop contains one 24-inch Lodge and Shipley engine lathe with taper attachment, two 14-inch

Lodge and Shipley lathes, one 14-inch Pratt and Whitney lathe with taper attachment, one 10-inch Reed speed lathe, one 16-inch Cincinnati shaper, one 24-inch by 6-foot Woodward and Powel planer, one Brown and Sharpe No 2 universal milling machine, one Brown and Sharpe No. 1 universal grinder, one 24-inch Prentice Bros. drill press, one power hack saw, one drill grinder, one emery stand and one grinding attachment for the lathes.

Each shop has its own tool room well arranged and stocked with small tools, gauges, measuring instruments etc.

The wash room is supplied with basins, running water and a hundred lockers.

The power room contains a 35 H. P. Atlas engine, a 15 H. P. induction motor, a No. 3 Stewart blower and a 70-inch Stewart exhauster.

AGRICULTURE AND HORTICULTURE.

Because of the situation of the Territorial University the educational work in agriculture and horticulture has taken peculiar form, being largely conducted on the correspondence plan, particularly through the "Timely Hints for Farmers" issued under the auspices of the Experiment Station, but of distinct educational value. Three thousand farmers of the Territory are reached more or less regularly by timely publications on subjects of vital interest. Farmers' Institutes, announcements of which are made from time to time, take the form of short courses in agriculture.

Small and well selected agricultural libraries of slight cost have been forwarded to a considerable number who have expressed a willingness to receive them.

It is believed that this method of dealing with our situation will become increasingly useful.

The equipment for agricultural instruction is good, consisting of an excellent seed collection, a green-house and gardens for experimental purposes containing many rare and interesting plants, and a well-selected agricultural library.

GYMNASIUM.

Herring Hall, the new gymnasium, is fully equipped for the purposes of the department of physical training and athletics. The apparatus is of Standard make, and includes forty chestweights, dumb-bells, bar-bells, wands, Indian clubs, a Medart vaulting horse, parallel-bars, a horizontal bar, a quarter-circle, an abdominal chair, wrestling machine, wrist machine, finger machine, chest expander, chest developer, climbing rope, flying rings, traveling rings, striking bag and drum, jump and vaulting stands, fencing foils and masks, basket balls and goals, five large mats and a set of anthropometric apparatus.

In the basement are located ninety-six lockers and five shower baths which are supplied with hot water from a heater with large reservoir.

In connection with this equipment are the base ball and foot ball field, and four fine tennis courts.

MILITARY.

Room O is used as an armory. It is fitted up with the necessary gun racks and accessories. The equipment includes 150 old style Springfield rifles, 100 Springfield cadet rifles with complete accoutrements, eight sabres

and belts, one 3-inch muzzle-loading rifle with carriage and complete equipment, musical instruments for the band, and signal flags. A large clear area south of the Library building is kept leveled and smooth for a drill ground and parade ground. At the rear of the Mill building are the targets for short range practice.

GENERAL ORGANIZATION.

I. College of Agriculture and Mechanic Arts.

In the College are offered courses leading to the following degrees:

1. Bachelor of Philosophy.
2. Bachelor of Science.
 - a. (General scientific course.)
 - b. In Civil Engineering.
 - c. In Mechanical Engineering.

II. The School of Mines.

A four-year course leading to the degrees of Bachelor of Science in Mining and Bachelor of Science in Metallurgy.

A short, two-years' course in mineralogy and assaying.

The Bureau of Mines and commercial assaying.

III. The Agricultural Experiment Station.

IV. The Sub-Collegiate Department of Manual Training.

English, scientific and classical subjects.

Manual training and domestic science.

Bookkeeping, stenography and business practice.

COLLEGE OF AGRICULTURE AND MECHANIC ARTS.

The courses offered in the College of Agriculture and the Mechanic Arts provide both a liberal training along literary and scientific lines and technical training along engineering, mechanical and agricultural lines. Great latitude of election is given in the literary and scientific courses, but the courses in engineering are more rigid in their requirements. Full details of the various courses follow. The aim in all is to combine the practical with the theoretical in instruction. The needs of a young and growing commonwealth are kept in mind, and a steady attempt is made to develop the adaptability and resourcefulness so necessary to meet the changing conditions.

ARIZONA SCHOOL OF MINES.

The School of Mines is designed for the education and training of young men in the arts and sciences directly involved in the industries of mining and metallurgy. Especial attention is given to the sciences of mathematics, physics, chemistry, mineralogy, geology and their applications. The two-years' course in assaying is designed to prepare students as assayers only. The Bureau of Mines and Assaying, while not directly connected with the work of instruction, affords with its laboratory and the influx of new material, a valuable object lesson to the advanced students of mining and metallurgy.

REGISTRATION.

All students are expected to register on registration day at the beginning of the year and at the beginning of the second semester, in the University office or in such rooms as may be designated on that day. Before making choice of elective subjects the student should in every case confer with the instructors concerned and with the committee on registration. A matriculation fee of \$5.00 is required of all students upon entering the University. No student will be registered until the matriculation fee has been paid. After this fee is once paid no further fee is required for future registration. After registration no change in classes can be made without the consent of the committee on registration.

Students entering from other institutions should present to the committee certified copies of their records in such schools, together with certificates of graduation or of honorable dismissal. A copy of the the school catalogue or course study should be furnished with the credentials, in order to facilitate the work of the committee.

TUITION.

Tuition is free to students of Arizona. For all non-resident students, tuition is \$10 for each semester. No reduction will be made for late registration or early withdrawal.

RECORDS.

The class standing of each student is determined by the instructor in charge. The method of ascertaining the student's record is left to the instructor, and his report in all cases in final.

DISCIPLINE.

The disciplinary policy of the University in all its departments is based upon the assumption that the students are young gentlemen and young ladies, who come to the institution with a high determination to utilize to the full the opportunities offered, and with a keen sense of duty, honor and courtesy to each other and to the faculty. Formal and explicit prohibitions and rules are few, but those will be rigidly enforced, with adequate penalties, and good order and discipline maintained. The University is a civil, rather than a military, community, and such privileges as will not be abused will be allowed all classes of students. In aggravated cases, such as cheating in University work, frequenting saloons, gambling houses, and other objectionable places, and serious breaches of peace or order, the faculty will not hesitate to proceed to the extreme measure of expulsion. In case of expulsion the student is required by regulations of the Regents and faculty to leave the campus immediately, and by Territorial statute to surrender his cadet uniform to the University. In all matters of discipline the faculty and President will strive for fairness, equity and efficacy rather than uniformity.

Students or classes desiring to make requests of the faculty should file their petition in the President's office before the hour of faculty meeting; class petitions must be presented at least two days before the time of meeting.

VACATIONS AND HOLIDAYS.

A short recess (see calendar, page 2) is taken at Christmas time. The long summer vacation begins about June first and continues until the middle of September.

The Thanksgiving recess extends from the close of the regular exercises on the Wednesday before Thanksgiving to the next Monday morning. During the spring of the past two years the cadet companies have made a practice march of from three to five days, which constituted in reality a third vacation. All legal holidays are observed by the cessation of ordinary University work.

Arbor day has been formally adopted by the University Regents as the regular anniversary on which shall be celebrated the founding of the institution, in connection with the ceremonies of tree planting.

LIVING ACCOMMODATIONS.

Provision is made so far as possible for furnishing board and rooms to students of both sexes upon the University grounds. Young men have comfortable quarters in South Hall, the men's dormitory building, which can accommodate about seventy-five students, two in a room. North Hall, the home of the young ladies, is in charge of an experienced and capable preceptress who has constant supervision of those rooming there.

Both dormitories are lighted by electricity. Rooms contain a clothes press, and are provided with single bedsteads, table, chairs, mirror, wash-bowl, pitcher and slop-jar. Students will supply their own mattresses, pillows, sheets, blankets, towels, rugs and brooms, and such other articles as they may desire for ornamenting their rooms. They will care for their own rooms under the direction of the head of the dormitory. The Dining Hall of the University has accommodations for one hundred students. It is under the management of a paid steward who is responsible to the President and the Board of Regents.

While the charge for board is very low, it is the aim of the management to serve substantial, wholesome, appetizing meals. All students having rooms in the dormitory are required to take their meals at the Dining Hall. Students and members of the faculty, who reside outside the dormitories may board at the Dining Hall.

FEES AND EXPENSES.

	Lowest.	Highest.
Tuition, free to students from Arizona...		
Tuition, students non-resident in Arizona, each semester.....	\$10.00	\$10.00
Maintenance fee (deposit) by students in Men's Dormitory.....	3.00	3.00
Maintenance fee (deposit) by male students residing in town.....	1.00	1.00
Mining excursions for advanced students,	20.00	40.00
Laboratory and shop fees, varying according to courses, per annum.....	1.00	30.00
Military uniforms.....	16.25	24.00
Books, per annum.....	5.00	20.00
Board, per month	17.00	20.00
Lights per room, per month50	1.50
Napkins.....	.50	.50

By resolution of the Board of Regents of the University, board is to be paid in advance on the first of each month. Checks and postoffice or express money orders should be made payable to the President. No reduction in the bill for board will be made for absence for a period of less than one week, except by special arrangement at the office.

Text-books may be obtained directly from the publishers through a book association managed on the co-operative plan under the direction of the faculty. Members of the cadet companies will be required to provide themselves with the prescribed uniform, which will be ordered by the University. The cost of the uniform, which must be deposited in advance, during the present year has been \$16.25. This uniform has shown better wearing qualities than a civilian suit of equal cost, and parents are urged to consider the matter of uniform when supplying their sons with clothing for the approaching University year. It may be worn on all occasions, and thus will remove the necessity for additional expenditure for outer clothing other than overcoats. When the warm weather of spring comes, the students are expected to purchase the regulation khaki uniform and campaign hat, the total expense being about \$7.

The University has at present no loan funds with which to aid students who must earn their way. Various positions about the grounds, buildings and laboratories of the University, paying from \$4 to \$20 per month, are filled by students who must be self-supporting. The number, however, is not large, and preference is given to students from Arizona and to those who have spent time enough in the University to demonstrate that they are earnest, capable, reliable young men, likely to do this outside work and at the same time maintain a good record as students.

The Philo Sherman Bennett scholarship was constituted by the gift of \$500 to the University in 1905, through the agency of Mrs. William Jennings Bryan, to be used in aiding young women to secure an education.

The income will be awarded to a deserving applicant in the year 1906-7.

RAILROAD RATES.

The Southern Pacific, the Maricopa, Phoenix & Salt River Valley, the Santa Fé, Prescott & Phoenix, the El Paso & Southwestern, and the Gila Valley, Globe & Northern railways have all generously allowed students half rates when journeying to and from their homes, over those parts of these railroads situated in Arizona. In the case of students coming to the University, these half rates may be secured by notifying the President of the University at least two weeks in advance, to enable him to secure the permits from the proper authorities. Tickets are then obtained by the student on application to the railroad ticket agent at his home or to the nearest agent in Arizona, e. g. Nogales or Yuma. Students at the University may secure transportation to their homes and return at vacation time by making application at the office of the President of the University. In case of any misunderstanding with the ticket agent, the student should pay full fare, take the agent's receipt and report the matter to the University authorities. The University can not undertake to secure rebates from the railroad companies in cases where full fare has been paid, unless it can be clearly shown that the railroad company's agents or officers are at fault.

In the case of students coming to the University over the Santa Fé, Prescott & Phoenix road, or over the Maricopa, Phoenix & Salt River Valley road, full-fare one-way tickets to Phoenix in the one case, and to Maricopa in the other, should be purchased and a certificate for the fare thus paid should be secured by the student.

Upon presentation of these certificates endorsed by the University, free return tickets will be issued to the points named.

REQUIREMENTS FOR ADMISSION.

Applicants for admission to any department of the University will be required to furnish satisfactory evidence of good moral character, and a certificate of graduation or of honorable dismissal from the schools with which they were last connected.

For admission to the Freshman class, applicants must be at least sixteen years of age and must satisfy requirements in subjects sufficient to give sixteen credits as described below. A credit is understood to be the equivalent of one study pursued satisfactorily for one year, one period a day, as ordinarily taught in high schools.

Students coming from approved high schools, and presenting a detailed official statement of work completed from the principals of such schools, will be excused by the committee on registration from entrance examinations in those subjects covered by the credentials, with the exception of English composition. Other students will be required to pass the entrance examinations.

For admission to the course leading to the degree of Bachelor of Philosophy the subjects and credits assigned each are:

English	4	Latin	3
Mathematics.....	2	Greek, French, German	
History and Civics.....	2	or Spanish.....	2
Science.....	1	Elective.....	2

For admission to the course leading to the degree of Bachelor of Science, including the degrees of Bachelor of

Science in Mining Engineering, Civil Engineering, Mechanical Engineering, Metallurgy, or Agriculture, the subjects and credits assigned each, are:

English.....	4	French, German or Span-	
Mathematics	4	ish.....	2
History and Civics.....	2	Science (Physics required)	3
		Elective	1

The scope of work required in these various subjects is as follows:

ENGLISH—(a) English classics. An acquaintance with the works named below. These works are divided into two classes, those intended for thorough study and those intended for general reading. The portion of the examination devoted to the former class will be upon subject matter, form, and structure. In addition, the candidate may be required to answer questions involving the essentials of English grammar, and the leading facts in those periods of English literary history to which the prescribed books belong. In the portion of the examination devoted to the latter class, the candidate will be required to present evidence of a general knowledge of the subject matter, and to answer simple questions on the lives of the authors. The form of examination will usually be the writing of a paragraph or two on each of several topics, to be chosen by the candidate from a considerable number—perhaps ten or fifteen—set before him in the examination paper. The treatment of these topics is designed to test the candidate's power of clear and accurate expression, and will call for only a general knowledge of the substance of the books. In preparation for this part of the requirement, it is important that the candidate

shall have been instructed in the principles of writing English. A knowledge of grammar is presupposed. (b) English composition. This requirement can be met only by examination of the candidate or by his presenting satisfactory composition books of themes certified by a former teacher as original uncorrected work. The examination will take the form of a theme of five hundred words on some subject familiar to the candidate and will be a practical test of his ability to express himself in writing clearly and consecutively. No candidate will be accepted whose work is notably defective in point of neatness, spelling, punctuation, idiom, or division into paragraphs. Those found lacking in composition will be required to make good the deficiency at once in a special class organized for that purpose.

No student will be admitted without examination, except on the certificate from his former instructors that the entire requirement has been fulfilled. Substantial equivalents, properly certified, will be accepted.

For thorough study: For 1906, 1907, Shakespeare's *Macbeth*; Milton's *L'Allegro*, *Il Penseroso*, *Comus*, *Lycidas*; Burke's *Speech on Conciliation with America*; Macaulay's *Essays on Milton and Addison*.

For general reading: For 1906, Shakespeare's *Merchant of Venice*, and *Julius Caesar*; the *Sir Roger de Coverley Papers* in "*The Spectator*;" Goldsmith's *Vicar of Wakefield*; Coleridge's *Rime of the Ancient Mariner*; Scott's *Ivanhoe*; Carlyle's *Essay on Burns*; Tennyson's *The Princess*; Lowell's *Vision of Sir Launfal*; George Eliot's *Silas Marner*.

MATHEMATICS—Arithmetic as covered in White's *Advanced Arithmetic* to the appendix, but these subjects

will be omitted in the entrance examinations: longitude and time, present worth, stock investments, exchange, equation of payments, compound proportion, partnership and cube root. Algebra, through quadratic equations, as given in Wells' Essentials of Algebra or Wentworth's New School Algebra. Plane geometry as treated in the latest editions of Wentworth or Wells. For students in the scientific or engineering courses, solid geometry and advanced algebra, each requiring a half-year of work, will be required. [Beginning in 1906 advanced algebra will be omitted, and plane and spherical trigonometry will be added.]

GENERAL HISTORY AND CIVICS—As much as is included in Adams' European History and Hinsdale's American Government, or Hart's Actual Government, or text books covering equivalent ground. To meet these requirements a large amount of reference work is expected. In place of General History the following will be accepted: History of Greece and Rome as contained in Myer's histories of Greece and Rome or an equivalent; and Coman and Kendall's or Larned's History of England.

*GREEK—As covered by Gleason and Atherton's Beginners' Greek Book; Xenophon's Anabasis, four books; Homer's Iliad, three books, with composition and the use of Hadley and Allen's, or Goodwin's Greek Grammar.

*LATIN—As covered by Collar's First Latin Book and Viri Romae, together with Allen and Greenough's Grammar and texts; sight reading; Caesar, four books,

*If any language is offered it must be to the extent of two credits, since a single year's study of a language is not considered of sufficient educational value to be entitled to credits.

or an equivalent; Cicero, four orations; Virgil, six books; sight reading from Nepos, Cicero and Gellius; Daniell's or Bennett's Prose Composition.

***GERMAN**—As covered by Spanhoofd's *Lehrbuch der deutschen Sprache*, and the *Syntax* (part II) or Thomas' *German Grammar*, with readings outlined for German 1, 2, 3, 4, or an equivalent.

***SPANISH**—As covered by Hills and Ford's *Spanish Grammar* with readings, etc., outlined for Spanish 1, 2, 3, 4, or an equivalent.

***FRENCH**—As covered by Fraser and Squair's *French Grammar* (Parts I and II), with readings, etc., outlined for French 1, 2, 3, 4, or an equivalent.

SCIENCE—Under this head may be offered the required number of credits in the following subjects: physical geography, physiology, botany, chemistry, physics, or elementary astronomy. At least half the preparation in science should consist of laboratory work. Note-books, covering such laboratory work as has been performed by the student, should be presented for examination.

ELECTIVE—The remaining credits required may be made up from additional subjects ordinarily taught in high schools.

Students from other institutions of equivalent rank may be admitted to classes higher than freshman upon presentation of properly authenticated certificates showing to the satisfaction of the faculty that they are qualified to proceed with their required work. These certificates

*If any language is offered it must be to the extent of two credits since a single year's study of a language is not considered of sufficient educational value to be entitled to credit.

must be accompanied by statements of honorable dismissal, or leave of absence.

By arrangements with the Arizona Normal School at Tempe, and the Northern Normal School at Flagstaff, students from these institutions may have their records transferred to the books of the University with proper credit, upon presentation of of a certificate duly signed by the principal. Students from this University may also obtain the equivalent privilege at the Normal Schools by presenting the proper certificate of standing, signed by the President.

The faculty desires to establish such relations with high schools and other educational institutions as will enable it to accept their certificates without question. To this end presiding officers are respectfully requested to correspond with the President.

COURSES OF STUDY AND DEGREES.

All facilities and privileges of the University are open to qualified persons of both sexes.

The University offers four-year courses of study leading to the degrees of Bachelor of Philosophy and Bachelor of Science, and to those degrees specialized as shown on page 42-43. In each course the work is partly required and partly elective, as described by schedules later. Each student doing full work is required to take not less than sixteen hours of class room work per week. In laboratory work a period from two to three hours is considered the equivalent of one recitation hour.

Persons of mature age and with sufficient preparation, who are not candidates for degrees, may be admitted to regular classes as special students, provided, however, that in all such cases they show to the satisfaction of the instructors in charge that they can take the course with profit to themselves and without detriment to the regular class.

The faculty reserves the right to omit classes in any course of instruction unless a suitable number of students register for the course.

Students who have completed satisfactorily the required work, and the specified amount of elective work, as shown in the accompanying schedules, will be given the degree of Bachelor of Philosophy or Bachelor of Science. The special character of any course of study may be indicated by adding to the degree the name of the department, as: Bachelor of Science in Mining Engineering, or Bachelor of Science in Metallurgy.

Military science and tactics or, for women, physical culture, is required during the Freshman and Sophomore

years. If for any reason a student is excused from these exercises, an additional subject having a minimum of three recitation hours per week will be required.

Credit toward degrees is given by means of a unit system which assigns to each course of instruction offered a certain number of units of credit. A unit ordinarily represents one class-room hour per week, or its equivalent, for one semester. One hundred and twenty-eight units, besides eight units in military science and tactics and physical culture, are required for obtaining a degree in any course.

Any candidate for a degree may present as part fulfillment of requirements for graduation an acceptable thesis embodying the results of a special study of some subject within the range of the course pursued. The subject of the thesis must be submitted for the approval of the faculty at the opening of the Senior year, and the completed thesis must be presented not later than three weeks before commencement day. The credit value will be determined by the faculty at the time the subject is approved.

GROUPS OF COURSES.

General—English, Mathematics.

Group A—Latin, Greek, French, German, Spanish.

Group B—History, Economics, Philosophy, Sociology.

Group C—Botany, Chemistry, Geology, Mineralogy, Physics, Zoology.

Group D—Civil Engineering, Mechanics Arts, Mechanical Engineering, Metallurgy, Mining Engineering.

The units necessary for the different degrees are as follows:

1. BACHELOR OF PHILOSOPHY.

a Required—English, 24, Philosophy, 15, History and Economics, 8.

b Group Elective—From Group A, 32; Group C, 16.

c Free electives—33.

2. BACHELOR OF SCIENCE.

a Required—English, 8; Mathematics, 16.

b Group Electives—From Group B, 4; Group C and D, 56.

c Free electives—44.

3. For the degrees of Bachelor of Science in Mining Engineering, Metallurgy, Civil Engineering, and Mechanical Engineering, the same work is required in all for the first two years, with differentiation during the third and fourth years.

Mining Engineering, Metallurgy, Civil Engineering,
Mechanical Engineering

First year.

Second year.

English, 1, 2	6 units.	Mathematics, 3, 4	6 units
Mathematics, 1, 2	10 "	Physics, 1, 2	8 "
Chemistry, 1, 2	8 "	Chemistry, 3, 4	8 "
Mech. Arts, 1, 2	8 "	Mech. Arts, 3, 4	4 "
	32 "	Civil Engin., 1, 2	8 "

Mining Engineering 34

Third year.

Fourth year.

Mathematics, 5, 6	9 units.	Mining Engin. 1, 2	8 units
Mineralogy, 1, 2	7 "	Geology, 3, 4	6 "
Geology, 1, 2	8 "	Metallurgy (lect.)	3 "
Civil Engin., 5, 6	8 "	Civil Engin., 10	4 "
	32 "	Mineralogy, 3, 4	4 "
		Mech. Engin., 1, 2	6 "
			31

Metallurgy

Third Year.		Fourth Year.	
Mathematics, 5, 6	9 units	Metallurgy, 1, 3,	
Mineralogy, 1, 2	7 "	4, 5, 6	13 units
Geology, 1, 2	8 "	Mining Engin., 1	4 "
Chemistry, 5, 6	8 "	Civil Engin., 5, 10	8 "
	<u>32</u>	Mech. Engin., 1, 2	6 "
			<u>31</u>

Civil Engineering

Third year.		Fourth year.	
Mathematics, 5, 6	9 units.	Civil Engin., 7, 8	8 units
Civil Engin., 5, 6	8 "	" " 10	4 "
" " 4	1 "	Mech. Engin., 1, 2	6 "
" " 9	4 "	Mining Engin., 1	4 "
" " 12	2 "	Elective	8 "
Geology, 1, 2	8 "		<u>31</u>
	<u>32</u>		

Mechanical Engineering

Third year.		Fourth year.	
Mathematics, 5, 6	9 units.	Mech. Engin. 5, 6	8 units
Civil Engin., 5, 6	8 "	" " 7, 8	8 "
Mech. Engin., 1, 2	6 "	Civil Engin., 10	4 "
Mech. Engin., 3, 4	4 "	Mining Engin., 1	4 "
Mech. Arts, 7, 8	4 "	Elective,	7 "
	<u>31</u>		<u>31</u>

COURSES OF INSTRUCTION.

Courses having odd numbers are given in the first semester; those having even numbers, in the second semester. The hours mentioned show the number of periods per week. The subjects are arranged alphabetically.

BIOLOGY.

PROFESSOR THORNBUR, MISS TILLMAN.*

The courses which follow are calculated to articulate with the work done in biology in the average western high school.

The Desert Botanical Laboratory of the Carnegie Institution of Washington, D.C., has been located in the mountains adjoining Tucson. In this laboratory, the southwest with its unique and as yet little investigated flora, gains what is destined to be one of the important centers of active, scientific research. The research facilities of the laboratory are all that could be desired, and the investigations upon the desert flora will appeal to students of botany from all quarters. In the light of the above, the importance of the Desert Botanical Laboratory to the University of Arizona and especially to the department will be apparent.

BOTANY 1, 2. GENERAL BOTANY—Botany 1, treats of the general principles of the histology and physiology of plants. Botany 2 completes the year's work with a

* Beginning September 1906.

general survey of plant types from Protophyta to Spermatophyta. Guide, Bessey's Essentials of Botany supplemented with lectures. Laboratory studies will form the basis of all the work. Open to all students. 4 hrs., or an equivalent, both semesters. 8 units.

BOTANY 3, 4. ADVANCED BOTANY—The second year's work is not definitely outlined, but it is purposely left open to be formulated as the needs of the students applying appear to demand. Courses in general morphology of the fungi, histology, physiology, and the taxonomy and ecology of the native flora are offered here. Opportunities are offered for research work. Open to all students who have taken Botany 1, 2. 4 hrs., or an equivalent, both semesters. 8 units.

ZO-LOGY 1, 2.—Conducted along lines corresponding very closely to those followed in Botany 1, 2. Laboratory studies as in that course are made the main feature of the work. In the study of the Mammalia constant reference is made to human anatomy, so that this portion is in part a review of the course in anatomy and physiology offered in the sub-collegiate department. Text-book, Parker and Hazwell's "Manual of Zo-ology." Open to all students. 4 hours, or an equivalent, both semesters. 8 units.

CHEMISTRY.

PROFESSOR GUILD, MR. HOLTY.

The instruction in chemistry has two main objects in view: first, to promote general culture; and secondly, to introduce students to technical work, especially in mining. The first two years' work in general chemistry, qualitative and quantitative analysis, places the student

in a position to take up advantageously the study of mining, agricultural chemistry or metallurgy.

CHEMISTRY 1. GENERAL CHEMISTRY—Lectures illustrating the chemical properties of the elements and their compounds, supplemented by recitations and laboratory practice. Text-books, Newth's Inorganic Chemistry. Open to all students. 4 hrs., first semester. 4 units.

CHEMISTRY 2. QUALITATIVE ANALYSIS—Practical work in the laboratory, including the analysis of alloys, commercial products, minerals and like substances. The course is accompanied by lectures and recitations. Text-book, Eliot and Storer's Qualitative Analysis, and various reference books. Open to students who have taken chemistry 1. 4 hrs., or an equivalent, second semester, 4 units.

CHEMISTRY 3. QUANTITATIVE ANALYSIS—Laboratory practice with lectures and recitations; the work will be chiefly in gravimetric methods of analysis. Open to students who have taken Chemistry 2. 4 hrs., or an equivalent, first semester. 4 units.

CHEMISTRY 4. VOLUMETRIC ANALYSIS—A continuation of the work in Chemistry 3, special attention being given to the methods of assaying employed in the West. 4 hrs., or an equivalent, second semester. 2 units, if discontinued March 15th, otherwise 4 units.

CHEMISTRY 5, 6. SPECIAL QUANTITATIVE ANALYSIS—The analysis of water, gases, oils, minerals. Open to students who have taken Chemistry 4. 4 hrs., or an equivalent, both semesters. 8 units.

*CHEMISTRY 7, 8. ORGANIC CHEMISTRY—Lectures on the carbon compounds; laboratory work in organic analysis and the preparation of organic compounds; vapor density and molecular weight determination. Open to students who have taken Chemistry 3, 4. 4 hrs., or an equivalent, both semester. 8 units.

*CHEMISTRY 9. SYNTHETIC CHEMISTRY—The preparation of pure chemical compounds from the crude mineral products. Open to students who have taken Chemistry 4. 2 hrs., or an equivalent, first semester. 2 units.

*CHEMISTRY 10. PHYSICAL CHEMISTRY—Lectures: Historical introduction leading up to a discussion of modern chemical theories. Open to students who have taken Chemistry 3. 2 hrs., second semester. 2 units.

*CHEMISTRY 11, 12. CHEMISTRY OF THE RARE ELEMENTS—The analysis and synthesis of uranium, molybdenum, tungsten, vanadium and cerium compounds. Open to students who have taken Chemistry 6 and 9. 4 hrs., or an equivalent, both semesters. 8 units.

CIVIL ENGINEERING.

PROFESSOR SMITH.

The courses in this department have been arranged with special reference to the engineering development of the Southwest. Especial stress will be laid on surveying, railroad and bridge work, and irrigation engineering. The design throughout the courses is to give the student a thorough and practical knowledge of the essential

* Not given in 1905-6.

principles of his profession, and to teach the technical practice of the times so far as possible without sacrificing in other directions. Engineering practice changes from year to year and a graduate who is thoroughly grounded in the principles of his profession will readily acquire the technical side.

CIVIL ENGINEERING 1, 2. SURVEYING—Use and care of instruments, including plane and solar compasses, levels, transits; plane land surveying; United States system of land surveys; city, topographical, and mine surveying; earthwork computations; determination of azimuth, latitude, longitude and time by observations on the circumpolar stars and on the sun. One full half-day each week is devoted to field practice; plots are made of field surveys and a topographic map of some area in the vicinity of Tucson is executed by each student. Lectures, recitations, drawing and fieldwork. Textbook, Raymond's "Surveying." Open to students who have taken trigonometry. 3 hrs., both semesters and Saturday forenoons. 8 units.

*CIVIL ENGINEERING 4. GEODESY—Size and shape of the earth; latitude, longitude and azimuth formulas; baseline apparatus; trigonometric leveling. Lectures and fieldwork. 1 hr., second semester. 1 unit.

CIVIL ENGINEERING 5. MATERIALS OF CONSTRUCTION—Their properties, preparation and use; stone, brick, lime, cement, concrete, timber, iron and steel. Lectures, recitations and laboratory work. 4 hrs., first semester. 4 units.

* Not given 1905-6.

CIVIL ENGINEERING 6. MASONRY CONSTRUCTION—Foundations on land and in water, cofferdams, cribs, caissons, round and sheet piling, bridge piers and abutments, retaining walls, dams, arches, the theory and practice in reinforced concrete construction. Graphical methods of determining stability. 4 hrs., second semester. 4 units.

*CIVIL ENGINEERING 7, 8. MODERN FRAMED STRUCTURES—Stresses in the various types of bridges under different systems of loading; graphical investigation of stability of arches and retaining walls; complete design with drawings for a plate girder bridge, and a steel frame building. Text-book, Merriman & Jacoby's "Roofs and Bridges." 4 hrs., both semesters. 8 units.

CIVIL ENGINEERING 9. RAILROAD ENGINEERING—Preliminary and location surveys; simple and easement curves, turnouts and switches; principles of economic location as based upon cost of construction, operating expenses, alignment and grades; maintenance-of-way. The fieldwork consists of the surveys for a railroad of sufficient length to secure familiarity with the methods of actual practice. Each student makes a complete set of notes, maps, profiles, calculations and estimates of cost. Open to students who have taken Engineering 1, 2. 4 hrs., until December, one hour and Saturdays through December and January. 4 units.

CIVIL ENGINEERING 10. HYDRAULICS—Velocity and discharge from orifices, weirs, tubes, and pipes; flow in sewers, ditches, canals, and rivers; measurement of

* Not given in 1905-6.

water power; water wheels of various types. Text-book Merriman's "Hydraulics," 4 hrs., first semester. 4 units.

*CIVIL ENGINEERING 11. PRINCIPLES OF IRRIGATION—A study of the present condition of irrigation development in the United States; irrigation legislation; methods of establishing rights to water; a brief reference to the engineering principles relating to the construction and maintenance of canals and reservoirs and the various means of diverting and measuring water for use in irrigation. Prerequisite, Engineering 2. 2 hrs., second semester. 2 units.

ECONOMICS.

MR. RUTHRAUFF.

ECONOMICS 1, 2. A study of the general principles and laws of economics based upon Seager's "Introduction to Economics." Special attention is given to the study and criticism of socialism, and the problem of municipal and government ownership of natural monopolies and public utilities. 2 hrs., both semesters. 4 units.

*ECONOMICS 3, 4. A general study of the history and theory of Economics based upon Marshall's "Principles of Economics," with lectures and required reading. This course aims to acquaint the students with the different modern theories, and economic plans for reform. 3 hrs., both semesters. 6 units.

ENGLISH.

PROFESSOR NEWSOM

The purpose of the courses outlined below is to give a general knowledge of English literature from the six-

* Omitted 1906-7.

teenth century to the present time. Chief stress is placed upon the study of a few authors of the most important periods, though the history of our literature is also traced from age to age. The course in composition aims to develop accurate thought and clear, vigorous expression.

ENGLISH 1 and 2. COMPOSITION—Prescribed for all Freshmen. *First Semester:* Short weekly themes corrected and rewritten. Selected readings from English and American writers of prose, with written and oral reports.

Second Semester: Fortnightly themes illustrating methods in narration, description, exposition, and argumentation. Hill's "Beginnings of Rhetoric and Composition" supplemented by lectures. Selected readings and reports thereon as in the first semester. 3 hrs., both semesters, 6 units.

ENGLISH 3 and 4. NINETEENTH CENTURY PROSE—From the publication of the Lyrical Ballads to the death of Ruskin 1798-1899. Prescribed readings, lectures, discussions, written reports. Primarily for Freshman in the Ph. B. course. 2 hrs., both semesters. 4 units.

ENGLISH 5 and 6. ELIZABETHAN LITERATURE—Shakespeare, selected plays; other Elizabethan dramatists, especially Johnson and Marlowe; Spenser's *Faerie Queene* and shorter poems. Lectures and discussions. 3 hrs., both semesters. 6 units.

* ENGLISH 7,8. EIGHTEENTH CENTURY LITERATURE—From the death of Dryden to the publication of the Lyrical Ballads, 1700-1798; special attention given to the

* Omitted 1906-7.

period of Queen Anne and the early romantic revival. Lectures and discussions. 2 hrs., both semesters. 4 units.

* ENGLISH 9, 10. SEVENTEENTH CENTURY LITERATURE—From the closing of the theaters to the death of Dryden, 1642-1700. 2 hrs., both semesters. 4 units.

ENGLISH 11, 12. NINETEENTH CENTURY POETRY—From the publication of the Lyrical Ballads to the death of Tennyson, 1798-1892. Lectures and discussions; Macmillan's Globe editions. 2 hrs., both semesters. 4 units.

FRENCH.

ASSISTANT PROFESSOR TURRELL.

FRENCH 1, 2. First Semester: Fraser and Squair's French Grammar (Part I), Aldrich and Foster's French Reader. Second Semester: Reading of Dumas' "La Belle Nivernaise," Labiche and Martin's "La Poudre aux Yeux," Halevy's "L'Abbe Constantin." Composition and dictation, with drill on the irregular verbs. 5 hrs., both semesters. 8 units.

FRENCH 3, 4. First Semester: Fraser and Squair's French Grammar (Part II). Merimee's "Colomba," Lamartine's "Graziella" or "Jeanne d'Arc," Feuillet's "Le Roman d'un jeune homme pauvre." Second Semester: Selected Readings, as DeVigny's "Cinq Mars," French Lyrics (Canfield), Victor Hugo's "Les Misérables" (Super), etc. 5 hrs., both semesters. 8 units.

FRENCH 5. THE CLASSICAL FRENCH DRAMATISTS. Reading of plays of Corneille, Racine and Moliere. Study of the History of French Literature to the 19th century. 3 hrs., first semester. 3 units.

* Omitted 1906-7.

FRENCH 6. HISTORY OF FRENCH LITERATURE IN 19TH CENTURY. Class reading of recent writers as Daudet, Dumas, Zola, Verlaine, Coppée, Rostand, etc. 3 hrs., second semester. 3 units.

[Courses 5, 6 were not given in 1905-6, but will be offered in 1906-7.]

GEOLOGY.

PROFESSOR TOLMAN.

The courses in Geology are constructed with special reference to the following: 1st, the development of the observational faculties; 2nd, training in inductive and deductive reasoning whereby each student discovers for himself the causes for each phenomenon observed; 3rd, practical application of geological principles to mining with special training in structural geology and mapping.

GEOLOGY 1, 2. GENERAL GEOLOGY—Geological processes, their causes and effects. The atmosphere, surface and underground water, the ocean and the ice and snow as geological agents. Earth movements; mountain and continent building, Vulcanism. Rocks, their origin and alterations. Structural geology (problems through the entire course). Short review of the physical history of the earth and correlated life progress. Detailed study of ore deposits.

Geological excursions once a month. Laboratory work is given in connection with the study of rocks, structural geology and ore deposits. Open to students who have taken or are taking minerology 1, 2. 4 hrs., a week both semesters. 8 units.

GEOLOGY 3, 4 TOPOGRAPHICAL AND FIELD GEOLOGY—Constructions of maps and sections. United

States Geological Survey methods of geological mappings. Two geological maps are required of each student. One of a portion of the Tucson mountains (composed of lava flows) and one of a district in the Rincon mountains. (faulted and folded sedimentary rocks). Prerequisite Geology 1, 2. All day Saturdays, both semesters. 6 units.

GERMAN.

ASSISTANT PROFESSOR TURRELL.

GERMAN 1, 2. First Semester: Spanhoofd's "Lehrbuch der deutschen Sprache," complete. Second Semester: Reading of easy texts, such as Andersen's "Bilderbuch ohne Bilder," Storm's "Immensee," von Hillern's "Hoeher als die Kirche," Gerstaecker's "Germelhausen." Composition, dictation and continued grammar drill. 5 hrs., both semesters. 8 units.

GERMAN 3, 4. First Semester: Thomas' German Grammar (Part II). Reading of Freytag's "Die Journalisten," Heine's poems and "Die Reisebilder," Lessing's "Minna von Barnhelm." Second Semester: Goethe's "Hermann und Dorothea," "Egmont," Schiller's "Wilhelm Tell," "Maria Stuart." An outline of the history of German literature will be given during the year using Bernhardt's "Deutsche Litteraturgeschichte," with library readings. 5 hrs., both semesters. 8 units.

*GERMAN 5. GERMAN LITERATURE IN THE NINETEENTH CENTURY. Lectures on the Romanticists and their successors. Class reading of Kleist, Grillparzer, etc. 3 hrs., first semester. 3 units.

*Omitted 1906-7.

*GERMAN 6. RECENT LITERARY MOVEMENTS IN GERMANY. The rise of naturalism and symbolism. Comparison with the Storm and Stress movement of the eighteenth century. Study of Wildenbruch, Fulda, Sudermann, Hauptmann. 3 hrs., second semester. 3 units.

HISTORY.

PRESIDENT BABCOCK, MR. RUTHRAUFF.

In the work in history emphasis is placed on the social and political development, the relation of cause and effect, and the unity of history. The laboratory method is used wherever possible and individual work insisted upon.

HISTORY 1, 2. ENGLISH HISTORY—Gardiner's Student's History of England is used as the basis for the work, with much assigned reading and the preparation of reports. Open to all students. 4 hrs., both semesters. 8 units. Mr. Ruthrauff.

*HISTORY 3, 4. AMERICAN COLONIAL HISTORY—A detailed study of the American colonies under Great Britain, and of the United States to the adoption of the Constitution. Lectures, assigned reading, and reports. Open to students who have taken History 1, 2. 3 hrs., both semesters. 6 units.

HISTORY 5, 6. CONSTITUTIONAL HISTORY OF THE UNITED STATES—A detailed study of the formation of the Union and of the political and constitutional history of the United States down to 1885, based on letters and speeches of American statesmen, public documents,

*Omitted 1906-7.

special histories. Open to students who have taken History 1, 2. 3 hrs., both semesters. 4 units. President Babcock.

LATIN.

MRS. STANLEY, MRS. NEWSOM.

The courses below are open to students who have completed the first two years of Latin in the sub-collegiate department, or an equivalent. Constant, thorough drills are given in technical grammar and prose composition. In reading, the matter is subjected to grammatical, metrical, rhetorical and historical explanation. The study of the text is made the means of mental discipline, of developing the faculties of observation and critical judgment, and of acquiring habits of thoroughness and accuracy.

LATIN 1, 2. CICERO AND OVID—Six Orations of Cicero. Selected Letters. Gleason's Term of Ovid. Exercises in prose composition. 4 hrs., both semesters. 8 units.

LATIN 3, 4. VIRGIL—Six Books. LIVY—Book I, Cicero's De Senectute. Open to students who have taken Latin 1, 2. 4 hrs., both semesters. 8 units.

MATHEMATICS.

PROFESSOR E. M. BLAKE, ASSISTANT PROFESSOR MEDCRAFT.*

MATHEMATICS I. COLLEGE ALGEBRA—Four hours per week. GRAPHICAL METHODS. One two-hour laboratory period per week. First semester. 5 units. Assistant Professor Medcraft.

* Beginning September, 1906.

MATHEMATICS 2. PLANE AND SPHERICAL TRIGONOMETRY—Four hours per week. GRAPHICAL METHODS. One two-hour period per week. Second semester. 5 units. Assistant Professor Medcraft.*

Mathematics 1 and 2 are prescribed for first year students in Mining Engineering, Metallurgy Civil and Mechanical Engineering. The work in graphical methods is supplementary to algebra and trigonometry and introductory to analytical geometry.

MATHEMATICS 3. ANALYTICAL GEOMETRY.—Prerequisite Mathematics 1, 2. 3 hrs.; first semester. 3 units. Prof. Blake.

MATHEMATICS 4. DIFFERENTIAL CALCULUS—Prerequisite, Mathematics 3. 3 hrs., second semester. 3 units. Prof. Blake.

Mathematics 3 and 4 are prescribed for second year students in Mining Engineering, Metallurgy, Civil and Mechanical Engineering.

MATHEMATICS 5. INTEGRAL CALCULUS—Prerequisite, Mathematics 4. 4 hrs., including one laboratory period, first semester. 4 units. Prof. Blake.

MATHEMATICS 6. ANALYTICAL MECHANICS—Prerequisites, Mathematics 5, and Physics 1, 2. 5 hrs., including one laboratory period, second semester. 5 units. Prof. Blake.

Mathematics 5, 6 are prescribed for third year students in Mining, Civil, and Mechanical Engineering.

NOTE.—Beginning September, 1907, trigonometry will be a preparatory subject and analytical geometry a

* Beginning September, 1906.

freshman subject; calculus will be given during the whole sophomore year; and analytical mechanics will occupy the whole junior year.

MECHANIC ARTS.

PROFESSOR HOLMES, ASSISTANT PROFESSOR HENLEY.

The mechanic arts courses comprise the elements of drawing and shop work. The work consists of lectures, recitations, drawing, tool and machine work. The courses are designed with special regard for the needs of the students in engineering. It will be noted that the courses outlined below vary considerably in their arrangement from those heretofore announced.

(COURSES FOR 1906-7)

MECHANIC ARTS 1. MECHANICAL DRAFTING—Lettering, tracing and blue printing, 3 two-hour periods a week, first semester. 2 units. Prof. Holmes.

MECHANIC ARTS 2. DESCRIPTIVE GEOMETRY—Church's seventeen problems on lines and planes. 3 two-hour periods a week, second semester. 2 units. Prof. Holmes.

MECHANIC ARTS 3. WOOD SHOP—Joinery, bench and lathe work, elements of pattern making. 2 three-hour periods a week, first semester. 2 units. Prof. Henley.

MECHANIC ARTS 4. FORGE SHOP—Forge work in iron and steel, tempering, case hardening and annealing. 2 three-hour periods a week, second semester. 2 units. Prof. Henley.

MECHANIC ARTS 5, 6. MACHINE SHOP—Bench and floor work, drill press, lathe, planer, milling machine.

grinder, etc. 2 three-hour periods, both semesters. 4 units. Prof. Henley.

MECHANIC ARTS. 7, 8. ADVANCED SHOP WORK—Manufacturing methods, erection of machinery. Open to students who have had Mechanic Arts 1, 3, 4, 5, and 6. Two periods, both semesters. 2 units. Prof. Henley.

MECHANIC ARTS 9, 10. ADVANCED DESCRIPTIVE GEOMETRY—This course is a continuation of Mechanic Arts 1, 2. Church's "Descriptive Geometry" is the text book used. The work covers shade, shadow and perspective. Open to all students who have taken Mechanic Arts 1, 2. 2 periods or an equivalent, both semesters. 4 units. Prof. Holmes.

MECHANICAL ENGINEERING.

PROF. E. M. BLAKE, MR. LIGDA.

MECHANICAL ENGINEERING. 1. HEAT ENGINES—Principles of thermodynamics as applied to steam and internal combustion engines, and compressed air machinery. Study of the general structural features and methods of operating the more important types of boilers, steam and gasoline engines. 2 hours and one weekly laboratory period, first semester. 3 units.

MECHANICAL ENGINEERING. 2. DYNAMO ELECTRIC MACHINERY—Theory underlying the generation transmission, and utilization of electric currents. Descriptions of the more important types of generators and motors. 2 hours and one weekly laboratory period, second semester. 3 units.

MECHANICAL ENGINEERING. 3, 4. KINEMATICS OF MACHINERY, AND ELEMENTARY MACHINE DESIGN. Theory and design of linkages, gears, cams, screws, etc. Two drafting room periods of two hours each per week, both semesters. 4 units.

MECHANICAL ENGINEERING. 5. MACHINE DESIGN. Continuation of Mechanical Engineering 3, 4. Exercises in design particularly directed towards the designing of complete machines. Three drafting room periods of three hours each per week, first semester. 4 units.

MECHANICAL ENGINEERING, 6. MECHANICAL ENGINEERING—Study of power plants and other machinery installations as to arrangement of parts, adaptability to intended work, economy of first cost and operation. Exercise in design of power plants and writing of specifications. One lecture and two drafting room periods of three hours each per week, second semester. 4 units.

METALLURGY.

PROFESSOR DE LASHMUTT.

METALLURGY I. INTRODUCTION TO METALLURGY—Physical properties of metals, alloys, thermal treatment of metals, thermal measurements, fuel, refractory materials, metallurgical processes, furnaces, thermo-chemistry, metallurgy of iron and steel. Seniors in Mining Engineering and Metallurgy. Lectures and recitations, 4 hrs., for 1 month, first semester. 1 unit.

METALLURGY 2. FIRE ASSAYING—Fire assay for gold, silver and lead. Bullion assays. 15 hrs. per week,

or an equivalent during March, April and May. Prerequisite Chemistry 3 and 4. 2 units.

METALLURGY 3. METALLURGY OF GOLD AND SILVER—Stamp milling, chlorination, cyanidation, pan-amalgamation; Patio, Cazo, Fondon, Kröhnke and Tina processes, hyposulphite leaching practice, etc. Lectures and recitations. Prerequisites, Metallurgy 1 and 2. 4 hrs., first semester. To be given after completion of metallurgy 1. 3 units.

METALLURGY 4. METALLURGY OF LEAD AND COPPER—Sampling, receiving, purchasing, roasting; blast furnace methods, reverberatory furnace methods, pyritic smelting, converting, desilverization of base bullion, electrolytic refining, hydro-metallurgy of copper, etc. Lectures and recitations. Prerequisites, Metallurgy 1, 2 and 3. 4 hrs., second semester. 4 units.

METALLURGY 5 and 6. METALLURGICAL LABORATORY—Concentration, amalgamation, cyanidation, chlorination, hyposulphite lixiviation, etc., tests together with mill work. 2 hrs., or an equivalent, both semesters. Primarily for seniors in the course in Metallurgy 4 units.

METALLURGY 7. ORE DRESSING—Breaking, crushing, separating, concentrating, sampling; mill processes and management. Lectures and recitations. Prerequisites Chemistry 3 and 4 and Metallurgy 2. 3 hrs., first semester. 3 units.

METALLURGY 8. Metallurgy of zinc, cadmium, nickle, mercury, bismuth, tin, antimony, cobalt, platinum, tungsten, molybdenum. Lectures and recitations. Prerequisites. Metallurgy 1, 2 and 3. 2 hrs., second semester. 2 units.

MILITARY SCIENCE AND TACTICS.

LIEUTENANT MC CLURE.

PRACTICAL COURSE—Infantry Drill Regulations, through the school of the batallion in close and extended order. Advance and rear guards, and outposts. Marches. The ceremonies of batallion review, inspection, parades, guard mounting, and escort of colors. Infantry target practice. Instruction in first aid to the injured. Required of all able-bodied male students throughout the Freshman and Sophomore years except that students who have satisfactorily completed four years of drill at the end of Freshman year may be excused from further work in the department. Elective during the remainder of the course. Juniors who elect this course may receive credit to the extent of two units. Three hours both semesters.

THEORETICAL COURSE—The Infantry Drill Regulations covered by the practical instruction. The Manual of Guard Duty. Small-Arms Firing Regulations, Parts I, II and VII. The Articles of War. One lecture on camps and camp hygiene. Lectures on other military subjects. Required of all commissioned and non-commissioned officers. One hour, both semesters.

Students claiming exemption from drill will be required to secure a certificate of disability from a physician designated by the faculty, unless the disability is apparent. Those so excused will be required to elect a subject in place of this course. The officers will be appointed from an eligible list determined by examination, both scholarship and class standing being taken into account, according to the principles governing such selection at the United States Military Academy.

Each member of the military organization will be required to provide himself with the regulation uniform upon his entrance. A deposit covering the cost of the uniform should be made upon registration. The uniform consists of cap, coat and trousers of cadet gray cloth trimmed with black braid, and closely resembles the undress uniform of the United States Military Academy at West Point.

MINERALOGY.

PROFESSOR GUILD.

The main object of the course in mineralogy is to familiarize the students with facts and methods that will enable him to determine the character of an ore or mineral by an observation of its physical properties and by the performance of a few simple tests with the blow-pipe. The value of such a course cannot be over estimated, since these quick methods of analysis are frequently needed in the field and mine when recourse cannot be had to a well-equipped chemical laboratory. The course is of value also to the student of general science, since it adds to the pleasure of a day in the mountains or field, and is necessary to full appreciation of the study of geology. The course is not only practical, but the theoretical side of the subject receives attention in mineral optics, crystallography and similar topics.

MINERALOGY 1, 2. Lectures and recitations in crystallography and the classification and uses of minerals; laboratory work in blow-pipe analysis and determinative mineralogy; work with the reflecting goniometer in measuring the angles of crystals, and with the polari-

scope in studying the optical properties of minerals; the study of a type collection of 600 minerals arranged and classified according to Dana. Text-books: Dana's "Text book of Mineralogy," and Brush's "Manual of Determinative Mineralogy and Blow-Pipe Analysis." Open to students who have taken Chemistry 2. 4 or 5 hrs., both semesters. 7 or 8 units.

MINERALOGY 3. Advanced crystallography and microscopic study of the rock-forming minerals. Open to students who have taken a course in elementary Geology, Mineralogy 2, and Physics 2. 3 hrs., or an equivalent, first semester. 2 units.

MINERALOGY 4. PETROLOGY—The preparation of thin sections of rocks for microscopic study, rock analysis, and the study of a type selection of rocks. Text-book, Harper's "Petrology for Students." Open to students who have taken Mineralogy 3. 3 hrs., or an equivalent, second semester. 2 units.

MINING ENGINEERING.

PROF. TOLMAN.

In this course attention is largely directed to the economics of mining and the laboratory work is so arranged that upon the completion of the course the student will have in his notes plans which will be of value in the practice of the profession.

MINING ENGINEERING. 1, 2. Ores, their nature and occurrence, location of claims, mining laws of the important mining countries of the world; prospecting, excavations; tunnels, shafts, timbering, underhand, overhand, square sett, filling and caving methods of mining, pumping, ventilation, transportation, hoisting, installation of machinery and surface improvements.

Methods for undeveloped properties compared with those for developed mines. Mine accounts, cost sheets, slope sheets, assay plans, methods of management, mine sampling and mine reporting. Prerequisites Mathematics 5, 6, Geology 1, 2. 2 hours and two laboratory periods of three hours each, both semesters. 8 units.

MINING ENGINEERING 3. PRACTICAL MINING—Before entering upon the work of the Senior year, all students who are candidates for the degree of B. S. in mining, must have spent at least four weeks in practical underground mining. The fulfillment of this requirement must be evidenced by the certificate of the mine superintendent or foreman, and by notes and sketches of the processes observed, to be presented to the faculty of the School of Mines, and discussed with them.

MINING EXCURSIONS. MINING ENGINEERING 4—In connection with the courses in Mining Engineering, Metallurgy, and Mineralogy, trips will be made to mining districts of Arizona and Sonora, usually one or two weeks in March or April. These trips are required of all candidates for the degree of B. S. in Mining Engineering.

The purpose of these trips is to afford the mining students an opportunity for close study and inspection of mining and metallurgical plants, and of rock formations and of minerals of commercial value. The students are accompanied by two professors, and every effort is made to make the trips of the greatest practical value. The visits are carefully scheduled and notes, with sketches, measurements and photographs are taken, and elaborated into comprehensive report by each student after the return. These trips are of incalculable assistance to the lecture, text-book and draughting room work.

The subjects of special consideration are transportation, both above and below the surface, mine surveying, methods of stoping and timbering, the best treatment for each ore, assaying and furnace charges, smelting practices, concentration of low grade ores, power generation, pumping and water supply, and mill construction.

During 1905-6 the mining districts of Tombstone, Bisbee, Nacozari, and Cananea, and the metallurgical plants at Douglas were visited in this way. The thanks of the University are due the superintendents of the various plants visited, for their efforts and care in acquainting the students with the works under their management.

PHILOSOPHY

MRS. STANLEY, (SEPTEMBER TO JANUARY) MR. FERREE,
(FEBRUARY TO JUNE.)

PHILOSOPHY 1. HISTORY OF PHILOSOPHY—A study of the basal concepts and fundamental problems of philosophical thought as developed historically. Lectures, recitation and assigned reading. Text-book Schwegler's "History of Philosophy." 2 hrs., both semesters. 4 units.

PHILOSOPHY 2. EVOLUTION—A study of the term in its widest extension, as the law of the cosmic process; its significance in the various departments of science and its bearing on philosophical and ethical thought. Reading in Fiske's "Cosmic Philosophy;" Le Conte's "Evolution and its Relation to Religious Thought;" Wallace's "Darwinianism;" Spencer's "Principles of Sociology;" Bagehot's "Physics and Politics," and Howison's "Limits of Evolution." Lectures and discussions. 2 hrs., both semesters. 4 units.

PHILOSOPHY 3. PSYCHOLOGY—A special consideration to the subject as applied to teaching. Lectures, recitations and collateral reading. Open to Juniors and Seniors. 4 hrs., first semester. 4 units.

PHILOSOPHY 4a. EXPERIMENTAL PSYCHOLOGY—The work is observational throughout and is designed especially to develop power to do first-hand work in the subject: (a); introspective exercises and daily class discussions, in which the student is trained to analyze his own consciousness, to describe its processes and their modes of connection, and its states; (b); experimental variation and control; (c); psychological literature and psychological theory, discussed in lectures, text-book and collateral reading. The work is based upon Titchener's "Outlines of Psychology" and Titchener's "Manual," Qualitative Series.

*PHILOSOPHY 4. PEDAGOGY—An account of educational evolution, both as a culture fact in the history of civilization and as a foundation for professional work; lectures, giving a brief but comprehensive outline of school systems, a special study of leading educators such as Comenius, Pestalozzi, Froebel, Mann and others; methods of teaching, school management, and school law. Arrangements have been made with the Tucson city schools to use the Holliday school as a practice school for this class. Open to students who have taken Philosophy I. 4 hrs., second semester. 4 units.

*PHILOSOPHY 5. LOGIC—Text-book, Jevon's "Logic;" reading from Mill, Hamilton, Thompson and

others. Open to Juniors and Seniors. 4 hrs., first semester. 4 units.

*PHILOSOPHY 6. ETHICS—Theoretical and practical ethics; view of the historical development of the science; origin and development of the moral consciousness; application of the principles of ethics to the problems of life. Lectures, discussions and assigned reading. Open to Juniors and Seniors. 3 hrs., second semester. 3 units.

PHYSICAL CULTURE.

MR. MURRAY.

This department is organized to supply the opportunity for such physical work as experience has shown to be necessary under modern conditions, to counteract the deleterious effects of close application to mental work and to favor the attainment by the student body of a high state of physical efficiency.

It is intended that a thorough physical examination, including an examination of the eyes, heart and lungs, shall preface the work of every student in physical culture. This examination will be made as soon as possible after the student enters the University and at intervals during his or her course for safety and for determining the results of the work. Anthropometric cards and charts are platted for the students when desired. In special cases the University reserves the right to require a complete physical examination by a designated physician at the expense of the student.

*Omitted 1905-6.

In addition to the regular class drill a certain part of which consists of training and contests in athletic sports, the University is represented by teams in football, baseball, track and field, tennis, and basket-ball. Every facility is provided for track and field athletics. The field on the campus contains gridiron, baseball diamond, tennis and basket-ball courts, sprinting paths, jumping and vaulting pits.

The course for women consists of systematic exercises for the harmonious development of the entire body, besides a course for the development of grace of movement and the production of symmetry of physique. Special corrective machinery is supplied for this department, so that even the weakest student may be given proper and healthful exercise. Those pursuing this course are required to provide themselves with a gymnasium suit, consisting of a blouse waist and divided skirt with the regulation gymnasium shoes. The suit requires four yards of double width, 54-in. dark blue serge. The waist has a sailor collar trimmed with white braid. The Butterick pattern may be used or ready-made suits may be had at the gymnasium for \$3.75.

The plan of work for the men is three-fold: general graded class work, corrective work, and elective athletic work. The athletic work is taken in combination with the class work in order that the student by this combination may obtain the best possible development. The corrective work is given under special supervision to all those who are in need of special development, and, also to those who are unable to do the regular class work. The students doing work in the gymnasium are required

to wear the regulation gymnasium shoes and suit. The average cost of this suit is about \$3.75.

PHYSICS.

PROFESSOR TOLMAN, (SEPTEMBER TO FEBRUARY) MR. FERREE, (FEBRUARY TO JUNE) MR. WILCOX.

The object of this course is to acquaint the student with the physical principles which underlie the higher courses of chemistry, mechanics, and engineering. Special attention is therefore given to the study of force and energy, the physics of liquids and gases and heat. One-third of the course is devoted to the study of electricity, for which the laboratory is especially well equipped.

PHYSICS 1, 2. Lectures, recitations and laboratory work. Open to students who have taken a course in elementary physics and Mathematics 1. 2 hrs., and 2 two-hour periods in the laboratory, or an equivalent, both semesters. 8 units.

SOCIOLOGY.

MR. RUTHRAUFF.

SOCIOLOGY 1. ELEMENTS OF SOCIOLOGY—A study of the nature, origin and development of the social forces; a treatment of the phenomena and laws of society as it is, including whatever conduces to or modifies human association. Fairbank's "Introduction to Sociology" will be used as a guide, and supplemented by lectures, collateral reading, and reports. Open to Juniors and Seniors. 3 hrs., first semester. 3 units.

SOCIOLOGY 2. CHARITIES AND CRIME—A consideration of social pathology, including an examination of the origin and nature of the dependent, defective, and

delinquent classes. A study will be made of the principles and methods of relief; cause of crime; prison systems; juvenile offenders; preventive measures, etc. Guide, Warner's "American Charities." Prerequisite, Sociology I. 3 hrs., second semester. 3 units.

SPANISH.

ASSISTANT PROFESSOR TURRELL

SPANISH 1, 2. First semester: "Introduccion á la Lengue Castellana" (Marion and Des Garennnes); Elementary Spanish Reader. Second Semester: Hills and Ford's Spanish Grammar complete. Reading of Alarcón's "El Capitán veneno," or "Novelas escogidas," etc. Composition, dictation and oral work. 5 hrs., both semesters. 8 units.

SPANISH 3, 4. First Semester: Composition and Syntax. Reading of Galdós' "Marianela," Alarcón's "El Niño de la Bola," or "El Final de Norma." Second Semester: Valdés', "José," Galdós' "Doña Perfecta." One hour each week is given to composition and letter-writing. 5 hrs., both semesters. 8 units.

SPANISH 5. Lectures in Spanish on the history of Spanish literature. The clasical Spanish drama. Study of the age of Lope de Vega and Calderón. Reading of Lope's "La Estrella de Sevilla," Calderón's "La Vida es Sueño." 3 hrs., first semester. 3 units.

SPANISH 6. Recent Spanish literature, with particular study of the modern drama. Reading of Eche-garay's "Ó Locura ó Santidad," and "El Gran Galeoto," Larra's "Partir á Tiempo," Nuñez de Arce's "El Haz de Leña," Galdós' "Electra," etc. 3 hrs., second semester. 3 units.

SHORT COURSE OF INSTRUCTION IN MINERALOGY AND ASSAYING.

In order to meet the needs of persons who desire to learn the art of assaying the common ores, and who have not the time required for a full four-years course of study, the Board of Regents have approved a short course of instruction in practical assaying, mineralogy, metallurgy, and allied subjects.

This course commences with the first semester in each year and requires at least two years. Students are advised, however, to take the regular course in metallurgy or mining engineering, if possible, since in two years they cannot expect to make more than a beginning in the subjects.

REQUIREMENTS FOR ADMISSION.

Those desiring to take this course are required to be at least eighteen years of age, to have good health, and to have a knowledge of English, physics, and algebra to quadratics, sufficient to enable them to pursue the course with advantage. This knowledge will be tested by examinations.

The fees and tuition are the same as for other departments. Each student is required to pay the cost of materials, glassware, and apparatus used by him. For this purpose a deposit of ten dollars will be required in advance each semester and any balance will be refunded.

The right is reserved to vary this course according to the aptitudes or necessities of those concerned.

FIRST YEAR.

General Chemistry, one semester.

Qualitative analysis, one semester.

Mathematics, two semesters.

Practical free-hand drawing and shopwork, or
• physics, two semesters.

SECOND YEAR.

Mineralogy and blow-pipe analysis, two semesters.

Assaying, one semester.

Qualitative analysis and wet assaying, one semester.

Mathematics, two semesters.

Geology, two semesters.

BUREAU OF MINES AND ASSAYING.

A separate department of the School of Mines under the name of "The Bureau of Mines and Assaying" has been established to receive and work ores, and to make assays and analysis of ores, minerals, mineral waters, and petroleum.

In accordance with the act of the Legislature of the Territory, approved March, 1897, and amended in March, 1899, assays of ores and minerals are made for the prospectors and miners of Arizona, and for others at fixed rates established by the law, and tabulated below. To meet the requirements of this work a special laboratory building of brick has been erected and maintained. It is fitted up as a complete assay office, and is provided with a double large brick coke-furnace, a melting furnace and gasoline furnaces in a fire-proof room. There are in addition, a parting and wet assay room, a balance room, and office.

Extreme accuracy and excellence of work are considered of more importance than pecuniary profits. All assays are made in duplicate and if not accordant are repeated. A special expert assayer is employed, and the assays are not made by students, who receive their instruction in the regular laboratories of the University.

The money received for assaying is deposited monthly to the credit of the assay fund which is used to pay the assayer and the cost of materials and apparatus.

SCHEDULE OF RATES.

In accordance with the Legislative enactment approved March 3, 1899, the Regents of the University of Arizona have established the following rates for assaying ores:

ASSAYING ORES FROM ARIZONA.

Silver and gold, or either	\$1.00
Silver, gold and copper	2.00
Copper, or lead, or zinc, or iron (one)....	1.00
Gold, silver, copper and lead	2.50
Gold, silver, copper and iron	2.50
Gold, silver, copper and zinc	2.50

For other determinations and analytic work, such a rate will be charged as the Director of the School of Mines may in each instance fix.

PAYMENT IN ADVANCE REQUIRED.

The director is required, in all cases, to hold the assay until the fee or charge therefor is paid. Remittances may be made by check or money order; or the money, securely wrapped, may be sent with the sample.

RATES FOR SAMPLING OR WORKING ORES.

Lots of 100 pounds or less, including assays of three metals	\$ 5.00
Each additional 100 pounds, to 500 pounds	1.00
Over 500 pounds to 1 ton	10.00
Each additional ton	4.00
Ordinary stamp mill test and plate amalgamation for first ton or fraction of a ton	20.00
From 1 to 2 tons	30.00
Pan amalgamation, including crushing and assays, ton	20.00

Large lots proportionately less; small lots more in proportion.

CYANIDE PROCESS.

The School of Mines is prepared to make experimental tests of ores and tailings by the cyanide process, in large or small quantities, at rates to be agreed upon with the Director.

Working tests and experiments by other processes may be undertaken at rates to be agreed upon in each instance, depending upon the amount of materials, time and labor required

CONCENTRATING (INCLUDING ALL ASSAYS)

Wet or dry test of lots under 500 pounds.....	\$15.00
500 pounds to 1 ton	20.00
Each additional ton.....	7.00

GRATUITOUS QUALITATIVE TESTS.

The determination of the nature of rare and peculiar minerals, not requiring a chemical analysis, or assay, is made gratuitously. Samples sent for this purpose should be in their original condition as broken out, and not crushed to a powder or pulp. Tests requiring determinations of the presence of gold or silver must be paid for at assay rates. Samples may be sent by mail at the rate of one cent per ounce. They should be distinctly labeled inside the package with the name of the sender, and a letter should be posted at the same time giving the full name and address, and inclosing a stamp for the reply. This offer of free examination is intended to apply to minerals unknown to the sender and does not cover special tests for precious metals or for any metal the presence of which is usually determined by an assay.

BULLION ASSAY.

Special attention is given to the retorting and melting of bullion and the assays of gold bars for shipment.

HOW TO SEND SAMPLES.

For small samples, under four pounds in weight, the most expeditious and cheapest way is to send by the ordinary mail. The postal laws permit the name of the sender to be written and enclosed in the package. Each sample should be labeled by a slip of paper, inside, giving the name and locality of the claim and the name of the sender.

The name of the claim is desired in order that the value and distribution of the mineral wealth of the Territory may be better known.

Special rates for freight on consignments to the "Director of the School of Mines," are granted by the Southern Pacific railroad from points in Arizona. Ask the agent at shipping point for particulars.

All business communications, checks and money orders should be addressed to the

ARIZONA SCHOOL OF MINES,

KENDRIC C. BABCOCK, Pres.

Tucson, Pima Co., Arizona.

THE AGRICULTURAL EXPERIMENT STATION STAFF.

KENDRIC CHARLES BABCOCK, Ph.D.

President of the University.

ROBERT H. FORBES, M. S. - - Director and Chemist

VINTON A. CLARK, B. S. - - Agriculturist and
Horticulturist.

FREDERICK W. WILSON - - - Animal Husbandman

JOHN JAMES THORNBUR, A. M. - - - - - Botanist

ALBERT EARLE VINSON Ph. D. - - Associate Chemist

T. D. A. COCKRELL, - - Consulting Entomologist

WALTER HAROLD MUELLER Secretary to the Director

ORGANIZATION AND WORK.

The Agricultural Experiment Station is a legally constituted department of the University, whose purpose is to "aid in acquiring and diffusing * * * useful and practical information on subjects connected with agriculture, and to promote scientific investigation and experiment respecting the principles and applications of agricultural science."

With the above objects in view, the organization of the station includes the departments of administration, agriculture and horticulture, animal husbandry, botany and chemistry, the whole or a major portion of the time of one or more members of the Station staff being devoted to each department of the station work. Provision is made for meteorological work also, though to a less degree.

Owing to the wide variation in agricultural conditions in Arizona, it has been found of advantage to distribute

the work so that each department is located, so far as possible, in that region most favorable to the accomplishments of its own special results. According to this principle, the various lines of Experiment Station work have been distributed as follows:

The Director's office and the departments of Botany and Chemistry are maintained at Tucson in the University buildings. Through this arrangement, the Experiment Station profits by the buildings and libraries of the University, while the University is benefitted from time to time by the teaching ability of members of the Station staff. It has been found that from this base of operations the three great agricultural districts of the Territory—Salt River Valley, the lower Colorado and the upper Gila—are accessible with equal convenience for field work and observations.

On the same ground—fitness of location for the work undertaken—the Experiment Station farm has been maintained and strengthened at Phoenix. Salt River Valley is intermediate in elevation, in situation, and in mean yearly temperature between the other two important farming districts above mentioned, and for this reason the agricultural and horticultural results obtained there are capable of the most general application in the territory at large.

On the same principle again, the date palm orchard, conducted in co-operation with the United States Department of Agriculture, is located in the alkaline district south of Tempe, where a successful demonstration of this palm as a commercial fruit producer will be of the greatest value, creating use for great areas of alkaline land in the arid Southwest.

Another orchard has just been planted on a tract near Yuma.

The range station also, for the study of worn-out range country with a view to its reclamation to usefulness is located in a typical district near Tucson, and is conducted under the auspices of the department of botany, co-operating with the United States Department of Agriculture.

The services of specialists in various subjects, such as entomology, meteorology, and soil survey work have also been secured from time to time.

The results of the Experiment Station work are made public at frequent intervals in the bulletins and reports of the Station. These publications are made in two series: first, the longer and more technical bulletins, stating in considerable detail the investigations as they mature; and secondly, the "Timely Hints for Farmers," which are brief writings issued at the time when they will be most useful, written in plain language, and presented in popular form. The annual reports also are for the most part written popularly, and afford a convenient and reliable summary of each year's work as it comes to completion.

The Experiment Station work conducted and published on the lines indicated above has a two-fold value. In the first place the suggestions made or derived from the investigations of the Station are of direct material profit to the agricultural public and are intended to be immediately applied to advantage in the betterment of agricultural practice. In the second place, these writings are intended to serve an educational purpose, inasmuch as they are so presented as to constitute lesson

sheets for the benefit of the careful reader. It may therefore be considered that the Experiment Station reaches a class of some thirty-five hundred readers in the Southwest at frequent intervals by means of its "Timely Hints" and other publications. The operations of the range study tract at Tucson, the Experiment Station farm at Phoenix, and the date palm orchards at Tempe and Yuma serve also as an object lesson to the adjacent public.

It is believed that this distributed and mobile organization is especially effective, not only for the purposes of the Experiment Station, but also for those of the University as well, since it allows the station to conduct its work in localities suitable for the accomplishment of results; and again, it causes the public to become better acquainted with the Territorial University, of which the Station is a department.

An appropriation of eleven thousand dollars, made for the use of the Station by the Twenty-second Legislature, very satisfactorily attests the estimation in which the work of the Station is held. The appropriation is intended for the improvement of the date orchard; for purchasing livestock and buildings for the farm; for issuing publications; and for holding farmers' institutes and short courses of instruction throughout the Territory.

Provision therefore, is made for the symmetrical development of this work in the Territory, both experimentally and educationally; and, prospectively, "the farmers' college" bids fair to increase in usefulness to the growing agricultural interests of the Territory.

PREPARATORY DEPARTMENT.

INSTRUCTORS.

KENDRIC CHARLES BABCOCK, Ph.D., President, Civics.

SIDNEY CARLETON NEWSOM, A. M., English.

JOHN JAMES THORNBUR, A. M., Botany, Biology.

CHARLES ALFRED TURRELL, A. M., French, German,
Spanish.

WILLIAM WHEELER HENLEY, A. B., Shopwork and
Drawing.

LIEUT. SAMUEL V. MCCLURE, Military Science and
Tactics, Mathematics.

WILLIAM GEORGE MEDCRAFT, A. M., Mathematics.

WILLIAM M. RUTHRAUFF, A. M., History.

GLENN A. WILCOX, B. S., Science.

A. MAY ASHWORTH, A. B., English.

MARION CUMMINGS STANLEY, A. B., Latin.

LEVONA PAYNE NEWSOM, Ph. D., Latin.

PAUL MURRAY, A. B., Physical Training.

ESTELLE G. LUTRELL, A. B., English.

JOSEPH CONRAD HOLTY, M. S., Chemistry.

FREDERICK E. TALMAGE, B. L., Bookkeeping, Stenogra-
phy, Typewriting.

ALICE SPITLER, B. S., Domestic Science.

GENERAL INFORMATION.

In this department the University offers the work of a well-organized, four-years high school, with the added advantages of shopwork and drawing and of domestic science. The general library and gymnasium are open to all students in this department.

The equipment of the scientific laboratories is available for use in this preparatory work, whenever it can be used advantageously, and makes possible strong work in elementary science. The instructors in this department are assisted by the professors of the college departments, several of whom regularly conduct preparatory classes. By reference to the course of study which follows, it will be seen that it offers a comprehensive training for those who may not be able to pursue their studies farther, while it gives a good preparation for college.

ADMISSION.

Admission to regular standing in the first year of the preparatory course presupposes the completion of the work of the eighth grade of the public or parochial schools. Students who do not bring certificates showing the completion of this work, must take examination to test their ability to pursue profitably the work of the first year.

The Board of Regents on April 10th, 1906, voted that after September 1, 1906, no pupils who have not completed the work of the ninth grade (or the first year of a high school) will be admitted into the University from cities in Arizona having more than 5000 population.

All students entering the preparatory department will be required to take an examination in oral reading. To remedy notable deficiency in this subject, the University will require extra work in addition to other studies.

In all cases in which the preparation of a student in a particular subject proves to be deficient, the University re-

serves the right to require the student to secure at his own expense the help of an approved coach until the deficiency is remedied.

COURSE OF STUDY.

The following course of study will be required of all students who fit themselves at the University for entrance to the Freshman class in 1906. Such variations from it will be made during the next year as will adapt it to the case of students already in the sub-collegiate department, who took part of their work under the former requirements.

Military drill is required of all able-bodied male students throughout the course. Physical training is required of all students, unless they are excused by the President upon presenting a certificate from one of the University physicians. The young men have drill three times per week and exercise in the Gymnasium twice. The young women have physical culture three times a week.

The language begun in the second or third year must be pursued for at least two years in order to secure credit towards graduation.

Though the subjects are for convenience grouped by years in the following schedule, the departmental method is followed. In the description of courses, the subjects are arranged by groups or departments in the consecutive order in which they are taken up and students will be required to take them in this order. Aside from this sequence the ability of each student must determine what subjects will be pursued at any given time, due regard to be given to the proper balance of subjects. The wishes of parents will always be given careful consideration in mak-

ing up the schedule of work for each student, but the final decision in the matter must rest with the committee on registration, which is composed of persons who have had long experience in secondary and collegiate teaching. Individual attention will be given to the needs of each student.

To each student who completes the studies of this course receiving a total of sixteen units (a unit representing a subject pursued for one year with five, or four, recitation periods per week), a certificate stating that fact will be given.

This certificate will entitle the holder to admittance to the corresponding University courses of instruction without examination.

FIRST YEAR.

(The figures represent recitations per week.)

English	5	Physical Geography	3
Algebra	5	Drawing and shop work,	
Greek and Roman History	2	or Domestic Science	5

SECOND YEAR.

English	5	*French (first year)	5
Algebra	5	*Spanish (first year)	5
European History	4	*Drawing and shopwork	
*Latin (first year)	5	or Domestic Science	5
*German (first year)	5	*Bookkeeping (7 hours)	5

THIRD YEAR

English	5	*French, (second year)	5
Plane Geometry	5	*German (first year)	5

*Subjects thus marked are elective. One elective must be chosen in the second year. In the third year and in the fourth year, electives making up at least nine hours must be chosen.

*Chemistry	5	*German (second year)	5
*Drawing and Shopwork	5	*Spanish (first year)	5
*Latin (second year)	5	*Spanish (second year)	5
*Greek (first year)	5		
*French (first year)	5	*Stenography	5

FOURTH YEAR

English	5	*Greek (second year)	5
Civics	3	*French “ “	5
Physiology	2	*German “ “	5
†Solid Geometry and		*Spanish “ “	5
*Algebra	4		
*Physics	5	*Parliamentary Practice	1
*Latin (third year)	4		

ENGLISH.

The English of the preparatory course is based upon what is known as the entrance requirements of New England colleges. The work is in general divided into three parts: Classics, studied in class, composition and grammar work done partly in class and partly outside; and supplementary reading done largely outside the class-room. All these parts of the work may be carried on at the same time, as the circumstances of the class seem to require, the classics and supplementary reading forming the basis of a large part of the work in grammar and composition. Throughout the course, however, a primary aim is to develop the student's individual power

*Subjects thus marked are elective. One elective must be chosen in the second year. In the third year and in the fourth year, electives making up at least nine hours must be chosen.

†Solid Geometry and Plane and Spherical Trigonometry beginning September 1907.

of expressing himself in words. The time allotted to these three phases of English varies from year to year, increasing attention being paid to the appreciative and critical faculty as the course advances. In the fourth year a brief outline history of English and American literature occupies about one-third of the year's work in English.

Five hours each week throughout the course are given to English. According to the following general outline selections from the list below are made at the discretion of the teacher, preference being given to the New England College Entrance Requirements, which are marked by an asterisk. *

FIRST YEAR.

ENGLISH GRAMMAR AND COMPOSITION receive one half of the time of the first year.

CLASSICS. Longfellow's *Tales of a Wayside Inn*, Bryant's *Water Fowl*, *Planting of the Apple Tree*, *Forest Hymn*, the *Antiquity of Freedom*, Lowell's shorter poems, Tennyson's *Enoch Arden*, Miller's *Daughter*.

SUPPLEMENTARY READING. *Talisman*, *Tom Brown at Rugby*, *Last of the Mohicans*, *The Sketch Book*, *The Man Without a Country*, *The House of Seven Gables*, **Ivanhoe*.

SECOND YEAR.

COMPOSITION AND GRAMMAR. As in first year with attention to figures of speech, reproducing the work of classic authors, elementary etymology, exercises in exposition, narration and description.

CLASSES. **The Vision of Sir Launfal*, **The Ancient Mariner*. *The Ballad Book* (Bates), *Sohrab and Rustum*

and *The Idylls of the King, studied as in first year.

SUPPLEMENTARY READING. Deserted Village, Lorna Doone, Tale of Two Cities, Life of Goldsmith, Quentin Durward, The Critic on the Hearth.

THIRD YEAR.

Composition and Rhetoric are continued with emphasis on elementary argumentation and exposition.

CLASSICS. Julius Cæsar, *The Merchant of Venice, The Princess, *Sir Roger de Coverley, Poems of Burns, Carlyle's Essay on Burns. These are for general reading as in the first and second years. For careful reading are the following: *Milton's L'Allegro, Il Penseroso, Comus, Lycidas; *Macaulay's Essay on Milton. Special attention will be given to the author, his times and surroundings, and his style.

SUPPLEMENTARY READING. Sesame and Lilies, Backlog Studies, Treasure Island, Kidnapped, Silas Marner, Alhambra.

FOURTH YEAR.

COMPOSITION AND GRAMMAR. Exercises in narration and description for flexibility and ease of expression and general preparation for entrance requirement "b" on page 36 of this Register.

CLASSICS. *Burke's Speech on Conciliation, Macaulay's *Life of Johnson, Essay on Addison, *Macbeth. The Tempest, Midsummer Night's Dream. These are all for thorough study.

HISTORY OF ENGLISH LITERATURE. From the earliest times, with text-book as guide, with a review in chronological order of the classics studied during the four

years of the course, to prepare for examination in entrance requirement "a" on page 35 of this Register. Special attention is paid to Keats, Shelley, Tennyson and other representative poets of the nineteenth century.

SUPPLEMENTARY READING. *Vicar of Wakefield, The Making of an American, The Newcomes, Oliver Twist, American Orations and Addresses.

MATHEMATICS.

FIRST YEAR.

ALGEBRA. Introduction, factoring, fractions, simple equations, simultaneous equations, and special problems.

SECOND YEAR.

ALGEBRA. Involution, evolution, theory of exponents, radicals, quadratic equations, and proportion.

After 1907 but two years will be devoted to preparatory algebra. The first year's work will be required for entrance, and additional courses will be outlined for more extensive research than those herein offered.

THIRD YEAR.

Plane geometry, including thorough work in original exercises.

FOURTH YEAR.

First Semester, solid geometry with original exercises.

Second Semester, algebra, comprising theory of exponents, quadratic equations, simultaneous equations and variation.

Beginning the second semester 1907 trigonometry will be required of fourth preparatory students instead of advanced algebra.

MECHANIC ARTS.

This work consists of both drawing and shop work, between which subjects the student's time is about equally divided. The course covers two years and is designed to furnish a thorough elementary knowledge of manual training as taught in the secondary schools of the country.

FIRST YEAR. Drawing—Freehand sketching in perspective and orthographic projection. Reinhart's lettering, free-hand working drawings.

Shop-work—"Sloyd," care and use of wood-working tools.

SECOND YEAR. Drawing—Mechanical drawing and geometrical problems.

Shop-work—Forging, joinery, wood-turning.

SCIENCE.

It is the object of the courses in science to initiate the student into the processes and methods used in laboratory work; to teach close observation, careful manipulation and logical deduction; to acquaint the student with the fundamental facts of the various branches of science and to give full practice in the use of good English in describing various observations and experiments. To insure better results in the notebooks, they will all be passed upon by one of the instructors in English.

PHYSICAL GEOGRAPHY. This course combining the laboratory method with the text-book, aims to give the pupils training in exact observation of familiar phenomena, like distance, weight, pressure of liquids and gases, temperature, winds, clouds and the habits of plants and

animals. The natural forces producing erosion, formation of soils and rocks, the processes of nature as seen in seed germination and plant growth (with demonstrations with the microscope) will be discussed, with frequent experiments and field excursions.

CHEMISTRY. A year's work with the text and in the laboratory, in such proportions as the instructor decides upon. Each student must keep a note-book in which he describes the process and results of his laboratory work.

PHYSICS. A thorough course consisting of three recitation periods and four laboratory periods per week, carried on along the lines laid down for the senior year in secondary schools. Each student must keep a note-book in which a minimum number of experiments must be written up.

PHYSIOLOGY. This course aims to combine careful laboratory instruction, with application of the knowledge to practical personal hygiene. This work will be co-ordinated with that of the department of Physical Culture. For part of the instructions the young men and women will meet in separate sections.

DOMESTIC SCIENCE.

The course in domestic science for young women is arranged to give instruction in the science and art of home economics, and to raise home making to a higher plane. It includes all branches of home science, hygiene, chemistry of cooking and cleaning, preparation of all food stuffs, both fancy and elementary, nursing and food for the sick, marketing, and the management of servants.

Two courses are offered in sewing. The first year includes fancy needle work, and the second year drafting, cutting and dressmaking. The course includes laundering laces and ribbons.

Social duties and customs of society are considered with peculiar care. The students have access in the domestic science library to all the best authorities.

HISTORY.

The aim of the work in history is to lead the pupil to see the development of races and nations along political, social and religious lines and to arouse in him a love for the subject and a habit of broad and discriminating reading.

The work of the first year consists of a survey of the development and characteristics of the Greek and Roman civilizations. A text such as Wolfson's or West's will be supplemented by collateral reading and a notebook.

The work of the second year includes mediaeval and modern history. The aim is to give the students an idea of the essential unity of history and the leading facts in the political development of races and nations. Adams' European History is used, supplemented by the reading of references contained therein.

Hart's "Actual Government" is the text-book in civics. The historical development of the subject is made prominent while practical problems, such as taxation and municipal government, are made the subjects of special investigation and study.

LATIN, GREEK, FRENCH, GERMAN AND SPANISH

For an outline of the courses in Latin and Greek see page 37, under requirements for admission.

For an outline of the courses in French, Spanish and German see pages 52, 54, 71.

BOOKKEEPING AND COMMERCIAL PRACTICE.

Bookkeeping is taught by the modern budget system. The work is individual and each student may progress as fast as his time and ability permit. The course is thorough in all the details of office practice. Students are made familiar with different filing cabinets, the filing of letters, the use of card ledgers, the copying and indexing of letters and bills in copy books. The course includes instruction in commercial law, with special emphasis laid on the ordinary forms of commercial paper and the different endorsements. The department is equipped with the latest vertical files, cabinets, letter press, and office sundries. All students in bookkeeping are required to take some other branch of mathematics and must show proficiency in English.

STENOGRAPHY AND TYPEWRITING.

A complete course in stenography is offered. The Gallagher-Marsh system, a system which has received the highest endorsement of leading court reporters on the Pacific Coast and which has been adopted by the Boards of Educations in the largest cities of California, has recently been adopted. The amount of time allotted for this work has also been increased from five hours to eight hours per week. The object of the course is to train students so that they may become practical stenog-

raphers. With this end in view particular stress is laid upon neatness, filing, copying, and indexing. This branch of the commercial department is equipped with up-to-date filing cases, office sundries, and six typewriters, four of which are Remingtons, one an Oliver and one the L. G. Smith Visible. Five of the typewriters are new. Students taking this work are required to have had one year in English, and to take English with this course.

ALUMNI ASSOCIATION.

The Alumni Association of the University of Arizona was organized on the second day of June, 1897.

The object as expressed in its constitution is: "To promote the interests of the University to secure unity among its graduates and to foster an attachment to our Alma Mater."

Concerning the last two clauses of this declaration it may be said that the organization is carrying out their meaning in a manner which leaves little if anything to be desired. There is no doubt regarding the loyalty of the graduates to the University of Arizona and no question of their unanimous desire for the prosperity of the institution.

The first clause of the above declaration, however, deals with a matter which in a sense admits of more growth than those just mentioned, and the members of the association realize that there is room for further progress in the accomplishment of this purpose.

It will be the aim of the alumni association to create a deeper feeling of interest and pride in the University of Arizona among the people of the Territory.

1895

Charles Oma Rouse, B. S., Superintendent of Schools, Pima County, Tucson, Arizona.

Mercedes Anna Shibell, B. S., [Mrs. A. J. Gould,] Tucson, Arizona.

Mary Flint Walker, B. S., [Mrs. Pearl Adams], Benson, Arizona.

1897.

Edward Marshall Boggs, C. E. [nunc pro tunc]
Chief Engineer Oakland Electric Railways, Oakland,
Cal.

Clara Cramond Fish, B. S., [Mrs. F. C. Roberts],
Tucson, Arizona.

George Ojeda Hilzinger, B. S., Teller in Bank, El
Paso, Texas.

Mark Walker, B. S., Metallurgist, Tombstone,
Arizona.

1898.

Hattie Ferrin, B. S., [Mrs. Charles Solomon], Solo-
monville, Arizona.

Granville Malcolm Gillett, B. S., Draughtsman in
Surveyor General's Office, Phoenix, Arizona.

Minnie Watts, B. S., [Mrs. W. B. Smith], Altaville,
Cal.

*John Desha Young, B. S.

1899.

Robert L. Morton, B. S. Assayer, Yuma, Arizona.

1900.

Ida Clarissa Flood, B. S., [Mrs. G. Dodge] Oakland,
Cal.

Samuel Pressly McCrea, B. S., A. B., Principal of
High School, Redwood City, Cal.

Charles Pierce Richmond, B. S. Cyanide Manager,
La Union, Salvador, Central America.

Florence Russell Welles, B. S. [Mrs. Wm. Angus],
Los Angeles, California.

*Died April 8, 1899.

1901.

Rudolph Castaneda, B. S., Surveyor, Tucson, Arizona.

Clara Ferrin, B. S., Teacher, Tucson, Arizona.

George Millard Parker, B. S., Denver, Colorado.

David Hull Homes, B. S., (nunc pro tunc) Professor of Drawing, University of Arizona, Tucson, Arizona.

1902.

Andrew Gilbert Aiken, A. B., B. S., Surveyor, Canton, New York.

Moses Blumenkranz, B. S., Assistant Superintendent Shannon Copper Company, Metcalf, Arizona.

Ruth Brown, Ph. B. [Mrs. Wilkins Manning] Tucson, Arizona.

Felix Grundy Haynes, B. S., Casa Grande, Arizona.

Rosa Belle Parrott, Ph. B., Teacher, Roseburg, Oregon.

Philip Matthew Reilly, B. S., Mining Superintendent, Cumpas, Sonora, Mexico.

Bertram L. Smith, B. S., Assayer, Silver Bell, Arizona.

Bessie Smith, Ph. B. (Mrs. Earle Davis), Tombstone, Arizona.

Walter James Wakefield, Assayer, Tucson, Arizona.

1903

Advanced Degrees:

Hon William Herring, LL. D., Tucson, Arizona.

John William Gorby, B. A., (Marietta) M. A., teacher. Chicago, Illinois.

Benjamin Franklin Stacey, (B. A., B. D., Lombard), M. A., Teacher, Pasadena, California.

Richard Lamar Drane, B. S., Chief Draughtsman, G. V., G. & N. Ry. Tucson, Arizona.

George Mark Evans, (LL. B., Michigan,) Ph. B., Instructor in University of Arizona, Tucson, Arizona.

Leslie Alexander Gillett, B. S. (Mining), Draughtsman, Surveyor General's Office, Phoenix, Arizona.

Georgia Ann Holmesley, Ph. B., Teacher, Clifton, Arizona.

Edward Horton Jones, B. S., Assayer, Magdalena, Sonora, Mexico.

John Williard Prout, Jr., B. S., Superintendent Mowery Mine, Patagonia, Arizona.

Thomas Edward Steele, B. S., Assayer, La Cananea, Sonora, Mexico.

1904

William Burnham Alexander, B. S., County Surveyor, Pima County, Tucson, Arizona.

Elbert John Hollingshead [Kimble] B. S., Teacher, Brownsberger School, Los Angeles, Cal.

Frank Caleb Kelton, B. S., Draughtsman, Tucson, Arizona.

Estella Markham Prout, Ph. B., Denver, Colorado.

John Williard Prout, Jr., B. S. (Mining). See 1903.

1905

Ora Elinor Norway, Patton, Cal.

MILITARY ORGANIZATION 1905-6

UNIVERSITY OF ARIZONA CADET BATTALION,
NATIONAL GUARD OF ARIZONA.

Commandant of Cadets
Lieutenant S. V. McClure, U. S. A.; Major, N. G. A.

STAFF.

Captain..... Hugh M. Wolflin
Adjutant.....First Lieutenant Burrell R. Hatcher
Quartermaster.....First Lieutenant William F. Drew
Sergeant Major..... Robert B. Murphey
Quartermaster Sergeant.....Edward W. White

COMPANY A.

Captain.....J. Elmer Johnson
First Lieutenant.....Fletcher M. Doan
First Sergeant..... Andrew P. Martin
Sergeant.....Harold D. Steinfeld
Corporal.....John H. Culin
Corporal..... Thomas S. O'Connell
Corporal.....Warren A. Grossetta
Corporal.....Norman A. Rose
Corporal.....Leon H. Strong

COMPANY B.

Captain..... Albert R. Buehman
First Lieutenant.....J. Clyde Hoyt
First Sergeant..... George W. Kohler
Sergeant.....Lynne F. Hazzard
Sergeant..... Fred Barthels
Corporal.....Rollin Brown
Corporal..... Vance P. Edwards
Corporal.....John M. Ruthrauff

TRUMPETERS.

Sergeant..... Horace R. Holbrook
Private.....Norman M. Barker
Private Julian Huddleston

COLOR GUARD.

Color Sergeant..... Frank W. Rose
Acting Corporal..... Howard W. Estill
Private.....Homer B. Batte

REGISTER OF STUDENTS

1905-6

GRADUATE STUDENTS.

Begg, William, A. B. (Toronto) Engineering, Geology,	El Oro, Mexico,
Ferrin, Clara, B. S., Arizona, Sociology, Philosophy.	Tucson, Arizona.
Holty, Joseph Gerard, Wisconsin, Metallurgy....	Tucson
Williams, David Carl, B. L., MacMinnville College,	
Philosophy	Tucson

SENIORS

Clegg, Chester Bennett.....	Roosevelt
Gebb, John Wesley.....	Jerome
Kilgore, Roy Bartley.....	Williams
Mead, Roy Gibbons.....	Tucson
Moore, Roy Webb.....	Tucson
Murphey, Carobel, A. B. (Cox College,)	Tucson
Reid, Ida Christina.....	Tucson
Wooddell, Minnie Louise.....	Tucson

JUNIORS

Brown, Harriet Estella.....	Tucson
Croasdale, Lawrence Broadhead.....	
.....	Delaware Water Gap, Pa.
Lee, Montrose Lucius.....	Omaha, Neb.
Meyers, George Higgins,	South Bend, Indiana
Purcell, Weda Ina.....	Tucson
Wolflin, Hugh Maupin	Tucson

SOPHOMORES.

Barthels, Fred.....	San Francisco, Cal.
Holbrook, Horace Rollin.....	San Bernardino, Cal.
Moore, Leon G.....	Tucson
Murphey, Robert Bivins	Tucson
Newton, Raymond Austin.....	Patchogue, N. Y.
Page, Alphonse Clyde.....	Tucson
Walker, Leland Ross	St. Louis, Mo.

FRESHMAN CLASS.

Bradstreet, Carroll Pitkin.....	New York City
Buehman, Albert Rex.....	Tucson
Cole, Rena Ann	Fort Lowell
Cook, Lillian E.....	Clinton, Ohio
Dinsmore, Benjamin Scott.....	Parnassus, Pa.
Drew, William Franklin,	Mesa City
Edwards, Vance Phillips.....	San Francisco, Cal.
Harwick, Ralph N.....	Buffalo, N. Y.
Hatcher, Burrell R.	Douglas
Johnson, Joel Elmer.....	Mesa City
Jones, Ralph Bartlett.....	Anaheim, Cal.
Kuster, Andrew Sherman,.....	East Aurora, N. Y.
La Barree, Grace Ysabel.....	Tucson
Mellgren, Walter Give.....	Tombstone
Minus, Clarence Amos,	Douglas
Pew, William James	Mesa City
Roberts, Dorothy,.....	Hartford, Conn.
Rodgers, Pauline.....	Tucson
Ruthrauff, John Mosheim	Tucson
Thompson, Arthur Perry	Phoenix
White, Edward Willard	Tucson

Wilkerson, Mabel,	Yuma
Wooddell, Charles Edward	Tucson

UNCLASSIFIED—COLLEGE.

Barrett, Vanette—History	Tucson
Bohnstadt, Jack—English, Economics...	Indianapolis, Ind.
Geddes, Robert—Spanish	Tucson
Goodin, Frances Earl—History	Tucson
Hunt, Effie Stewart	Tucson
Jernegan, Theresa Tromp—English.....	Wishawaka, Ind.
Kinman, E. M. —Metallurgy	Denver, Col.
Doan, Fletcher M.—Assaying, English.....	Tucson
Plummer, Wallace Vincent—Spanish.....	Boston, Mass.
Rodgers, Annie E.—History	Tucson
Shattuck, Herbert Parker—Spanish.....	Tucson
Spitler, Maud Dillon—Languages.....	Dayton, Ohio
Thompson, Imogene—English.....	Tucson
Wilcox, Emma Kester—English, Spanish, History,	Tucson
Williams, La Rue Hudson, Spanish.....	Tucson

FOURTH PREPARATORY.

Angius, Dan	Bisbee
Brown, Charles Owen	Tucson
Brown, Clara Agnes.....	Tucson
Brown, John Stephenson.....	Tucson
Calloway, Lawrence Arthur,	Phoenix
Culley, Edith Emily	Tucson
Grossetta, Warren Arthur.....	Tucson
Hazzard, Lynn Franklin	Bisbee
Hoyt, Joseph Clyde.....	Jerome
Jones, Raymond William	Topeka, Kan.

Kohler, George William	Tucson
Leslie, Beppie Lee	Tucson
MacDonald, Donald.....	Tucson
Martin, Andrew Philip	Tucson
O'Connell, Thomas Sarsfield,.....	Tucson
Post, Anita Calneh.....	Yuma
Reed, Sheldon Allanson,.....	Tucson
Samuels, Alice Huntington.....	Tucson
Steinfeld, Harold Donau.....	Tucson
Wren, Ina May,.....	Bisbee

THIRD PREPARATORY.

Angius, John	Bisbee
Bates, Columbus Earl.....	Batesville, Texas
Carroll, Henry Harris.....	Memphis, Tenn.
Cassiday, Clifford Harry.....	Tucson
Cheyney, Mary Neal.....	Tucson
Conwell, Albert Lee.....	Douglas
Cook, Clifford Morton.....	Clinton, Ia.
Drachman, Myrtle Augustine.....	Tucson
Duffy, Mary Margaret.....	Tucson
Goldtree, Estella Esther.....	Tucson
Gregory, Minnie Hortense.....	Tucson
Gungl, Edward Joseph.....	Fort Huachuca
Haas, Olive.....	Tucson
Lully, Alex Gray.....	Nogales
McClosky, Pearl Louise.....	Tucson
Montijo, Manuel, Jr.....	Tucson
Millar, Leslie Creighton.....	Tucson
Murphey, Elizabeth Ella.....	Tucson
Nutt, Anne	San Diego, Cal.
Purcell, Ivy Mae.....	Tucson

Rose, Francis Winfred	Young
Ryder, Frank	Tucson
Scholefield, Helen Mar	Tucson
Sine, Eva Jessie	Tucson
Strong, Leon Henri	Tucson
Trippel, Alfred Alexander	Tucson

SECOND PREPARATORY.

Adams, David Lee	Dragoon
Attix, Mary Starr	Tucson
Batte, Homer Benjamin	Tucson
Beck, Charlotte Ellen	Tucson
Bell, Sylvester D	Tucson
Bennie, Florence Mary	Clifton
Bohannon, Mary Selene	Tucson
Brown, Earl George	Tucson
Brown, Marguerita Bernice	Tucson
Brown, Kenneth Brooke	Tucson
Brown, Rollin	Tucson
Button, Charles Aca	Williams
Cassiday, Robert Maxwell	Tucson
Clayshulte, Julia Cole	Tucson
Coles, Henry Oliver	Bisbee
Corda, Mary Wilhelmina	Olive Camp
Culin, John Harding	Tucson
Dannemiller, Charles Raymond	McCabe
Donnelly, Albert Francis	Tucson
Duffy, Alice E. Elizabeth	Tucson
Duffy, Harriet Loretta	Tucson
Estill, Howard Wilmot	Tucson
Firth, Charles Abraham,	Aravaipa
Fryer, Joseph Kent	Tucson

Gleason, Dale	Quartzite
Guerry, Horace Dixon	Tucson
Guerry, Marquis Lafayette	Tucson
Hawke, William Allen	Tucson
Heney, Ruth Esther	Tucson
Huddleston, Julian	Tucson
Huss, William R.	Yuma
Judd, Bessie	Tucson
Kohler, Barbara Hess	Tucson
Long, Robert Kistner	Tucson
McClure, John Clarenden	Tucson
Mashbir, Sidney Freudenthal	Safford
McNeil, Clara May	Tucson
McNealy, Mabel	Tucson
Nielsen, Hilda Dagmar	Tucson
Nielson, Gwynne Eleanor,	Tucson
Potter, Delbert D.	Clifton
Purcell, Maria Ella	Tucson
Pusch, Henrietta Louisa	Tucson
Millar, Edward B.	Tucson
Robbins, Dell	Tucson
Rose, Norman Allen	Young
Sine, Janet Volume	Tucson
Skinner, Ida Belle	Tucson
Smith, Felicia Grace	Clifton
Thompson, Lucille	Tucson
Thompson, Lilian Virginia	Tucson
Trippel, Amy Irene	Tucson
Wheeler, Charles A.	Tucson
Wooddell, Florence Ella	Tucson

FIRST PREPARATORY

Adams, George Cleve	Tucson
Allison, Josephine	Tucson
Barker, Lawrence Ward	Tucson
Campbell, William Riggs	Tucson
Cannon, Frank Mullen	Congress
Christie, Gerald Franklin	Tucson
Clark, Benjamin Harrison,	Benson
Clark, Mary Ellen	Tucson
Dorn, Ella Pauline	Tucson
Estabrook, Florence Edith	Tucson
Goldring, Abraham	Tucson
Gonzales, Lottie Helen	Tucson
Hamilton, Loiseles	Tucson
Hardiker, Fred Earl	Douglas
Hawke, Viola May	Tucson
Heney, Benjamin	Tucson
Henry, Lena Beatrice	Tucson
Henry, James Malcolm	Tucson
Hoff, Florence Lydia	Tucson
Hosmer, William Ernest	Cananea, Mex.
Huddy, Viola Edith	Pearce
Jones, Sidney Raymond,	Clifton
Knestric, Emma Frances	Tucson
Larimer, Florence Howard,	Tucson
Mason, George Kemper,	Jerome Junction
Menager, Mamie	Tucson
Morales, Teresa	Tucson
Mobley, Janet Edith	Tucson
O'Connell, Mildred L.	Tucson
Orfila, Peter Antonio	Tucson
Pritchard, Estalla M.	Tucson

Pusch, Wilhelmina.....	Tucson
Robles, Maria Joaquina.....	Tucson
Rodgers, Helen.....	Tucson
Roletti, Charles, Jr.	Tucson
Shaw, Harry Downing.....	Tucson
Simpson, Jennie Bell,	Tucson
Smith, Charlotte Bell,.....	Clifton
Sydnor, Arthur Edward,.....	Globe
Taylor, George A.....	Safford
Wakefield, William Edward.....	Tucson
Williams, Isaac Jackman.....	Martinez
Wooddell, Leslie.....	Tucson
Wooden, Oliver Newton,.....	Dennison, Texas

UNCLASSIFIED—PREPARATORY.

Bell, Helen Margaret—Spanish, Bookkeeping.....	Tucson
Carpena, Guillermo—English, Manual Training, Nogales	
Castanedo, Aurelio—English, Manual Training...	
.....	Cananea, Mexico
Cole, Carl Henry—Algebra, English, Chemistry, Globe	
Davidson, William Simpson—Mathematics, Economics	
.....	Joliet, Ill.
Frances, Mary Agnes—English, Stenography, Ger-	
man.....	Tucson
Hadsell, Idora Pearl—English, Stenography,.....	Buckeye
Kresse, Arnold Carl—Chemistry.....	Tombstone
Lord, Alexander—English, Manual Training, Mocte-	
.....	zuma, Mexico
Lord, Santiago—English, Manual Training, Mocte-	
.....	zuma, Mexico
McClosky, Albert Charles—Stenography, English, Tucson	
Moore, Charles—English, Manual Training, Mocte-	
.....	zuma, Mexico

Pease, Ione Gertrude—English, Spanish,	Tucson
Pates, Willie Washington—Latin, English, Albany, Tenn.	
Salazar, José Urbano—English, Manual Training,	Chihuahua, Mexico
Sporleder, Louise—History	Tucson
Torres, Miguel—English	City of Mexico
Ulloa, Eva—English, Domestic Science, Cananea, Mexico	
Wright William Edward—Latin	Tucson

SUMMARY

Graduate Students	4	
Seniors	8	
Juniors	6	
Sophomores	7	
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Total College		63
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Total Preparatory		163
Total for the University		226

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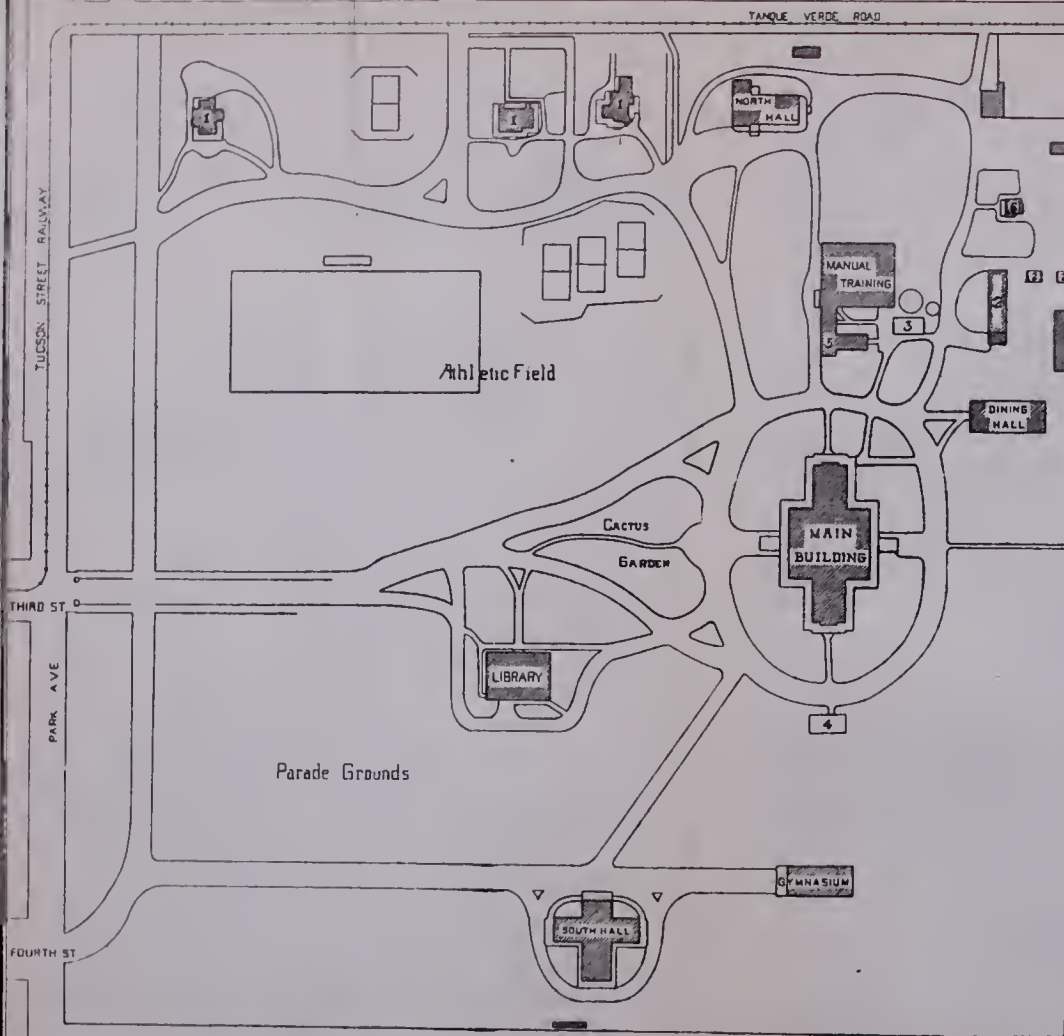
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REGISTER
OF THE
UNIVERSITY OF ARIZONA

SIXTEENTH YEAR
1906-1907

ANNOUNCEMENTS
1907-1908

Tucson, Arizona
1907



—LEGEND—

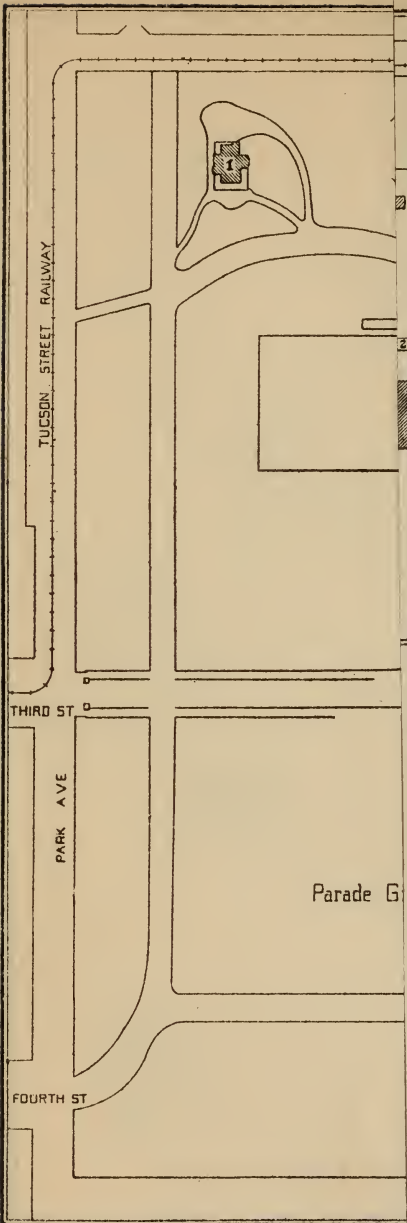
- 1 COTTAGES
- 2 GREEN HOUSES
- 3 POWER HOUSE
- 4 METEOROLOGICAL STA
- 5 ASSAY DEPT
- 6 DOMESTIC SCIENCE COTTAGE

Map of the
UNIVERSITY
 OF
ARIZONA.

TUCSON A.T.

Student Surveys
 Scale

240 Feet to 1 Inch.



—LEGEND—

- 1 COTTAGES
- 2 GREEN HOUSES
- 3 POWER HOUSE
- 4 METEOROLOGICAL STA
- 5 ASSAY DEPT
- 6 DOMESTIC SCIENCE COTTAGE

Map of the
Campus
UNIVERSITY
OF
ARIZONA.

TUCSON A.T.

Student Surveys
Scale

240 Feet to 1 Inch.

REGISTER
OF THE
UNIVERSITY OF ARIZONA

SIXTEENTH YEAR
1906-1907

ANNOUNCEMENTS
1907-1908

TUCSON, ARIZONA
F. E. A. KIMBALL, Printer
1907

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CALENDAR.

1907.

Sept. 12, Thursday	. .	}	Entrance Examinations.
Sept. 13, Friday	. .		
Sept. 16, Monday	. .		Registration Day.
Sept. 17, Tuesday	. .		First Semester begins.
Nov. 27, Wednesday	. .		Thanksgiving recess begins
Dec. 2, Monday	. .		Instruction resumed.
Dec. 21, Saturday	. .		Holiday recess begins.

1908.

Jan. 6, Monday	. .		Instruction resumed.
Jan. 31, Friday	. .		First Semester ends.
Feb. 3, Monday	. .		Second Semester begins.
May 31, Sunday	. .		Baccalaureate Discourse.
June 1, Monday	. .		Exhibition Military Dept.
June 2, Tuesday	. .		Exhibition Mechanic Arts Department.
June 3, Wednesday	. .		Commencement.

BOARD OF REGENTS.

Ex-Officio

HON. JOSEPH H. KIBBEYPhoenix
Governor of the Territory.

HON. R. L. LONGPhoenix
Superintendent of Public Instruction.

Appointed by the Governor.

MERRILL P. FREEMAN, *Chancellor*.....Tucson

GEORGE J. ROSKRUGE, *Secretary*.....Tucson

CHARLES H. BAYLESS, A. M., *Treasurer*.....Tucson

A. V. GROSSETTATucson

FACULTY.

KENDRICK CHARLES BABCOCK, Ph. D.

B. L., 1889, Minnesota; A. M., 1895, Harvard; Ph. D., 1896, Harvard.
President; Professor of History. 1903.*

WILLIAM PHIPPS BLAKE, A. M.

Ph. B., 1852, Yale; A. M., Dartmouth; D. Sc., Pennsylvania.
Professor of Geology, Emeritus. 1895.

ROBERT HUMPHREY FORBES, M. S.

B. S., 1892, M. S., 1895, University of Illinois.
Director and Chemist Agricultural Experiment
Station. 1894.

FRANK NELSON GUILD, M. S.

B. S., 1894, M. S., 1903, Vermont.
Professor of Chemistry and Mineralogy. 1897.

DAVID HULL HOLMES, B. S.

1892-1894, Washington University; B. S. as of 1901, Arizona.
Professor of Mechanic Arts and Drawing. 1898.

GEORGE EDSON PHILIP SMITH, C. E.

B. S., 1897; C. E., 1899, Vermont.
Irrigation Engineer. 1900.

JOHN JAMES THORNBURGH, A. M.

B. S., South Dakota [Agricultural]; B. S., 1897, A. M., 1901, Nebraska.
Professor of Biology; Botanist, Agricultural Ex-
periment Station. 1901.

*Dates following titles indicate appointment to service in the University.

IVAN DELASHMUTT, B. S.

B. S., 1901, California.

Professor of Metallurgy. 1904.

VINTON A. CLARK, B. S.

B. S., 1898, Vermont.

Professor of Agriculture and Horticulture, Agricultural Experiment Station.* [Residence, Phoenix.] 1904.

SAMUEL VICTOR McCLURE

First Lieutenant, U. S. A., 1896, West Point.

Professor of Military Science and Tactics. 1904.

EDWIN MORTIMER BLAKE, Ph. D.

Engineer of Mines, 1890; Ph. D., 1893, Columbia.

Professor of Mathematics and Mechanics. 1904.

SIDNEY CARLETON NEWSOM, A. M.

A. B., 1895, Harvard; A. M., 1898, Chicago.

Professor of English. 1904.

CYRUS FISHER TOLMAN, Jr., B. S.

B. S., 1896, Chicago.

Professor of Geology. 1905.

GAVIN N. HOUSTON, C. E.

C. E., 1893, Princeton.

Professor of Civil Engineering.† 1906.

ALBERT EARLE VINSON, Ph. D.

B. S., 1901, Ohio [State]; Ph. D., 1905, Goettingen.

Associate Chemist, Agricultural Experiment Station. 1905.

CHARLES ALFRED TURRELL, A. M.

B. S., 1896, Nebraska; A. M., 1901, Missouri.

Assistant Professor of Modern Languages. 1904.

*Resigned May 1, 1907.

†Resigned April 1, 1907.

WILLIAM WHEELER HENLEY, A. B.

A. B., 1905, Leland Stanford, Jr.

Assistant Professor of Mechanic Arts. 1905.

FREDERICK W. WILSON, B. S.

B. S., 1905, Kansas [Agricultural].

Assistant Professor of Animal Husbandry. 1905.

WILLIAM GEORGE MEDCRAFT, A. M.

A. B., 1898; A. M., 1904, Kansas Wesleyan.

Assistant Professor of Mathematics. 1906.

ANDREW ELLICOTT DOUGLASS, A. B.

A. B., 1889, Trinity.

Assistant Professor of Physics and Geography. 1906.

WILLIAM BURNETT McCALLUM, Ph. D.

B. S. A., 1894, Toronto; Ph. D., 1904, Chicago.

Associate Professor of Vegetable Physiology and
Pathology. 1907. (January).

MARION CUMMINGS STANLEY, B. L.

B. L., 1900, California.

Instructor in Philosophy. 1902.

ESTELLE G. LUTRELL, A. B.

A. B., 1896, Chicago.

Instructor in English; Librarian. 1904.

FREDERICK EDWIN TALMAGE, B. S.

B. S., 1903, California.

Instructor in Stenography and Book-keeping. 1904.

LEONA PAYNE NEWSOM, Ph. D.

A. B., 1892; Ph. D., 1895, Franklin.

Instructor in Latin. 1905.

A. MAY ASHWORTH, A. B.

A. B., 1901, Smith.

Instructor in English. 1905.

VICTOR LIGDA, B. S.

B. S., 1904, California.

Instructor in Physical Training and French. 1906.

OPAL I. TILLMAN, B. S.

B. S., 1905; M. S., 1906, Ohio State.

Instructor in Domestic Science and Botany. 1906.

IDA CHRISTINA REID, Ph. B.

Ph. B., 1906, Arizona.

Instructor in History and Mathematics. 1906.

C. G. HOOVER.

Rochester College (Indiana).

Instructor in Music.

RAYMOND C. BENNER, M. S.

B. S., 1902, Minnesota; M. S., 190-, Wisconsin.

Instructor in Chemistry. 1906.

EDWARD E. FREE, B. S.

B. S., 190-, Cornell.

Assistant Chemist, Agricultural Experiment Station.
1906.

FREDERICK EDWIN TALMAGE, B. S.

Secretary of the University. 1904.

HERBERT BROWN

Curator Territorial Museum.

MRS. CORNELIA M. STEWART

Preceptress of Young Women. 1903.

MRS. MARY HENRY AITON, M. D.

M. D. Northwestern.

Medical Examiner for Women. 1905.

ARTHUR W. OLCOTT, M. D.

A. B., 1884, Princeton; M. D., 1887, St. Louis.

Medical Examiner for Men. 1905.

WILLIAM GEORGE MEDCRAFT, A. M.

Head of Men's Dormitory. 1905.

JAMES S. CASSELMAN

Secretary to the Director of the Agricultural Experiment Station. 1906.

S. P. GREENLEAF

Superintendent of Buildings and Machinery. 1907.

IVAN DELASHMUTT, B. S.

Commercial Assayer. 1906.

STUDENT ASSISTANTS.

[Service not continuous through the year in every case.]

Rollin H. Holbrook

Lawrence A. Calloway

Burrell A. Hatcher

J. Clyde Holt

Walter Mellgren

Joseph L. Gould

Frederick Barthels

Willard H. Nash

Raymond A. Newton

John J. Engle

Theodore Chapin

Edwin White

Vance P. Edwards

H. Oliver Coles

Frances M. Babcock

Guy Emmons

Mabel Wilkerson

Frank Cannon

William F. Drew

G. Kemper Mason

George W. Kohler

Norman A. Rose

A. Perry Thompson

Charles A. Firth

STANDING COMMITTEES.

1906 -1907.

The President is ex-officio member of all committees.

Executive.

Professors Forbes, Holmes, E. M. Blake.

Registration and Classification.

Professors Guild, E. M. Blake, Newsom, Medcraft.

Library.

Professors Guild, Smith, Turrell, Miss Lutrell.

Printing and Publication.

Professors Forbes, Newsom, Mr. Talmage.

Athletics.

Professors Thornber, Houston, Mr. Ligda.

Public Exercises.

Professors E. M. Blake, Holmes, Mrs. Stanley.

Intercollegiate Debate.

Professors Thornber, Newsom.

Manual Training.

Professors Holmes, Smith, E. M. Blake.

Co-Operative Association.

Mr. Talmage.

Sub-Collegiate Department.

Professors Newsom, Medcraft, Miss Ashworth, Miss Reid.

Rhodes Scholarship.

President Babcock, Professors Newsom, Guild.

UNIVERSITY OF ARIZONA.

**Established by Act of the Legislative Assembly, 1883;
Opened to Students, October, 1891.**

PURPOSE AND ORGANIZATION.

The University of Arizona is a part of the system of public education established for the Territory, and aims, as head of such system, to fill the same position as that occupied in the States by the State Universities. In general, the organization of the University is in accordance with the Morrill Act of 1862, creating the Land Grant Colleges. The United States has already set apart fifty-seven sections of valuable public land in the northern timber belt, to which the University will receive full title upon the admission of the Territory into the Union. In creating the University, the Legislative Assembly wisely unified under one management the various schools and institutions of higher learning or investigation, which in some States and Territories have been widely and completely separated—the colleges of liberal culture, the schools of Mines and Engineering, the Agricultural College, and the Agricultural Experiment Station. No professional school of law, medicine, or arts has yet been organized. On the other hand, while the high schools of the Territory are in the formative period, the desire to make the University serviceable to all has led to the establishment and maintenance of a sub-collegiate department.

The purpose of the University of Arizona is, in the language of the organic law, "to provide the inhabitants of this Territory with the means of acquiring a thorough knowledge of the various branches of literature, science and the arts;" and so far as possible a technical education adapted to the development of the peculiar resources of Arizona. In furtherance of this latter purpose, instruction is provided especially in subjects fundamental to agriculture, the mechanic arts, mining, and metallurgy. The University, by the nature of its situation, frankly lays its strongest emphasis upon the course in mining engineering. It is, in reality, in a great mining laboratory, surrounded as it is on all sides by great mines. Some of these mines developed on a large scale are within a few miles of the city and the number and magnitude of such enterprises are steadily increasing. Probably no University in the United States offers such fine advantages to the students of mining engineering who desire to see the actual operation of great mines, or the development of great enterprises, while carrying on the theoretical and experimental work of the mining course. The advantages in civil engineering are hardly less noteworthy, for Tucson is not only a division point on the main line of the Southern Pacific Railroad, with large shops and roundhouses, but it has the administrative and engineering headquarters for five of the subsidiary or allied lines of the Southern Pacific system in Arizona and in Sonora, Mexico, commonly known as the Randolph lines. All these lines are undergoing extensive expansion and rebuilding, and so furnish excellent opportunities for observation and vacation employment for students of civil engineering.

The Agricultural Experiment Station, a department of the University, is engaged wholly in investigating and developing the agricultural resources of the Territory.

The government of the University is vested in a corporation styled The Board of Regents of the University of Arizona, consisting of the Governor of the Territory and the Superintendent of Public Instruction, ex-officio, and four other members appointed by the Governor.

LOCATION AND CLIMATE.

The University of Arizona is located at Tucson, a city of twelve thousand inhabitants, on the main line of the Southern Pacific railway, 312 miles west of El Paso, Texas, and 500 miles east of Los Angeles, Cal. The city lies in a broad, flat valley at an elevation of 2,400 feet above sea level and is surrounded by mountains. Its dry, mild, and equable climate has made Tucson a famous winter resort unsurpassed for healthfulness.

The winter climate is especially good; the temperature is cool and strengthening but not severe, the lowest temperature recorded during the average year being about twenty degrees above zero, Fahrenheit. Little rain falls during the winter; fogs are all but unknown; cloudy days are rare. The percentage of sunshine throughout the winter is greater than that recorded at any other place in the United States. Owing to the extreme dryness of the air the highest temperatures known are less oppressive to the senses and less dangerous to the health than the summer heats of the upper Mississippi Valley States. The total amount of rainfall averages less than twelve inches.

The University Campus, consisting of fifty-five acres, is situated upon high ground about a mile from

the business center of the city with which it is connected by an excellent electric street-car line. On every side it commands a view of mountain scenery of remarkable extent and grandeur. The buildings are lighted by electricity furnished by the city plant.

An abundant supply of unusually good water for household, laboratory and irrigation purposes is drawn from a large well on the Campus from a depth of one hundred and twenty feet.

The grounds have been carefully laid out in drives, lawns and gardens. A large number of palm, olive, umbrella, ash, pepper, bagota and cottonwood trees give the Campus quite the air of a well kept park.

BUILDINGS.

The main building, University Hall, is 200x150 feet, two stories in height; the first story of gray stone, the second of red brick. It is completely surrounded by a wide two-story veranda. The building contains recitation rooms, laboratories and apparatus rooms of various departments, an assembly room, and the office, laboratories and library of the Agricultural Experiment Station.

The Library and Museum building, costing about \$32,000, including furnishings, was occupied in January, 1905. It is a handsome red brick and Bedford sandstone building, with a massive tile roof. The interior finish is in natural oak and pine. The offices of the President and Secretary of the University, three lecture rooms for the departments of geology, mathematics, English and history, work rooms for the library and museum, and a laboratory for the department of geology are on the first floor. The Library reading room is on the second floor;

a large, well-lighted room, beautifully furnished with heavy solid oak reading tables, desks and wall cases. The stack-room at the rear is fitted up with the most modern steel stacks. The Museum occupies part of the first floor and the west half of the second floor. Fine oak and plate glass cases constitute the furnishings.

North Hall, a dormitory two stories in height, built of gray stone of fine quality, is occupied by the college men. Besides the parlor and rooms of the instructor in charge, it contains seventeen rooms, each large enough to accommodate two students. During the summer of 1906 the building was remodeled, in part by the addition of a shower bath and toilet rooms.

South Hall, a large brick building containing forty rooms, besides bath and toilet rooms and store rooms, is the dormitory mainly for preparatory students. It will accommodate seventy-five students.

West College is now used as a dormitory for young women. It is a two story brick house with wide porches, surrounded with vines, shrubbery, lawns and trees.

The Dining Hall, built of red brick, provides ample boarding accommodations for all persons living on the campus.

The Shop and Assay building is a large, substantial brick structure. It contains a commodious drawing room for mechanical and free-hand drawing, a large laboratory for forge work, machine practice and carpentry, and a laboratory, instrument room and lecture room for the department of civil engineering. Two other rooms are used for lockers, and for the motor and engine. The commercial assaying department occupies a number of

rooms fully equipped with a large melting furnace, the necessary muffle furnaces, and other accessories for making complete and accurate assays.

The Mill or Mining Machinery building, located to the northeast of the main group of buildings, is a plain wooden structure in which are placed the stamp-mills, jigs, concentrating tables, separators, etc., necessary for the mining laboratory.

Herring Hall, the Gymnasium, is a very substantial high building, 40x80 feet, constructed of red brick and white plaster. It was erected in 1903, the gift of Professor James Douglas and his associates of the Copper Queen Consolidated Mining Company, through Colonel William Herring, after whom it was named.

The Pump house and mechanical engineering laboratory was built during the summer of 1905 with funds appropriated by the legislative assembly. By the use of brick, cement and iron it is practically fire proof, thus insuring safety to the well and pumps supplying the University with water for all its uses.

Two two-story brick residences are occupied by the President of the University and by the Director of the Agricultural Experiment Station.

Other buildings are the cottage occupied by the department of domestic science, three greenhouses, a brick barn, and various smaller out-buildings used for shops and store rooms.

MAINTENANCE.

The University is supported by funds supplied by the United States Government and the Territory of Arizona. By the provisions of the Morrill Act of 1890, the

University receives annually from the United States the sum of \$25,000 for the College of Agriculture and Mechanic Arts, established in accordance with the Act of July 2, 1862. Beginning with July 1, 1907, this fund will be increased by \$5,000, in accordance with the Act of 1907. For the support of the Agricultural Experiment Station the University receives from the same source an annual appropriation of \$15,000 by the Act of Congress of 1887, known as the Hatch Act; and \$7,000 (for 1907-8, \$9,000) by the Adams Act of 1906. The Territory of Arizona provides, for 1906-7, the proceeds of a .3-5 mill tax on the assessed valuation of property of the Territory, which in 1906 amounted in round numbers to \$30,000. Besides these sums, the University receives from year to year, by special grants of the Territorial Legislative Assembly, appropriations for specific purposes. \$20,000 dollars was thus voted for the years 1905 and 1906, to be devoted to minor buildings, improvements, repairs, publications, etc. In 1907, \$5,600 was appropriated for the benefit of the work of the Agricultural Experiment Station, and \$40,000 (one-half available in January, 1908, the balance in January, 1909) towards a building for the departments of chemistry, mineralogy, physics, biology and astronomy. It is expected that construction of this science hall will begin about November, 1907.

EQUIPMENT.

LIBRARY.

The library, containing 11,000 bound volumes and 12,000 pamphlets, is open to the use of all students. Of these volumes a collection of complete sets of scientific

and literary periodicals, to which additions are being made yearly, is of special service in reference work.

The books are classed by the decimal system and shelved in numeric order with a further author division according to the Cutter numbers. The catalogue is the usual dictionary card catalogue of authors, subjects and titles in one alphabetical arrangement. Library of Congress cards are used whenever obtainable. The Reading Room is supplied with books of general reference which may be consulted by the students without any formality. The following current periodicals and newspapers are on file for the use of students and general readers in the Reading Room:

PERIODICAL LIST.

*Advocate of Peace,	American Machinist,
American Architect and Building News,	American Mathematical Society, Bulletin,
American Blacksmith,	American Mathematical Society, Transactions,
American Chemical Journal	American Naturalist,
American Chemical Society, Journal,	Arena,
American Historical Review	*Arizona Mining Review,
American Institute of Mining Engineers, Transactions,	Association of Engineering Societies, Journal,
American Journal of Pharmacy,	Athenaeum,
American Journal of Science,	Atlantic Monthly,
American Journal of Sociology,	Biedermann's Zentralblatt fur Agrikulturchemie,
	Bookman,
	Botanical Gazette,
	Botanisches Centralblatt,

*Donated.

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| *California Cultivator, | Forum, |
| Canadian Entomologist, | Franklin Institute, Journal, |
| Cassier's Magazine, | Geological Magazine, |
| Cement, | Geological Society of Amer- |
| Century, | ica, Bulletin, |
| Chemical News, | Geologisches Centralblatt, |
| Chemical Society, Journal, | Graphic, (London) |
| (London) | Harper's Monthly Magazine, |
| Chemisches Centralblatt, | Harper's Weekly, |
| Collier's Weekly, | International Studio, |
| Cumulative Book Index, | Irrigation Age, |
| Delineator, | Journal of Geography, |
| Deutsche Chemische Gesell- | Journal of Geology, |
| schaft, Berichte, | Journal of Political Economy |
| Dial, | Ladies' Home Journal, |
| Economic Geology | Literarisches Zentralblatt, |
| *Educational Gazette, | Literary Digest, |
| Educational Review, | Living Age, |
| Electrical Review, | *Lowell Observatory, Bul- |
| Electrical World, | letin, |
| Electrochemical and Metal- | McClure's Magazine, |
| lurgical Industry, | Manual Training Magazine, |
| Engineering and Mining | Mines and Minerals, |
| Journal, | Mining and Scientific Press, |
| Engineering Magazine, | *Mining Reporter, |
| Engineering News, | *Mining Review, |
| Engineering Record, | *Mining World, |
| Espana Moderna, La, | Nation, |
| Everyday Housekeeping, | Nineteenth Century and |
| *Farmer's Voice, | After, |
| Fern Bulletin, | North American Review, |
| Forestry and Irrigation, | *Our Dumb Animals, |
| *Donated. | |

Our Times,	School Review,
Out West,	Science,
Outing,	Scientific American,
Outlook,	Scientific American, Supple-
Plant World,	ment,
Poet-lore.	Society of Chemical Indus-
Popular Science Monthly,	try, Journal,
*Prairie Farmer,	Scribner's Magazine,
Public Libraries,	Societe Francaise de Miner-
Publishers' Weekly,	alogie, Bulletin,
Reader's Guide to Periodi-	Society of Civil Engineers,
cal Literature,	Transactions,
Review of Reviews,	Torrey Botanical Club, Bul-
School of Mines Quarterly,	letin,
	World's Work.

NEWSPAPERS ON FILE IN THE READING ROOM.

*Arizona Blade,	Los Angeles Times,
*Arizona Bulletin,	Mojave County Miner,
Arizona Daily Star,	*Oasis,
*Arizona Gazette,	Prescott Weekly Courier,
Arizona Range News,	Southwestern Stockman,
*Arizona Silver Belt,	*Tempe News,
Arizona Weekly Journal	Tucson Citizen,
Miner,	Tucson Post,
Coconino Sun,	Tombstone Epitaph,
Bisbee Review,	Weekly Republican.
*Graham County Guardian,	

The Carnegie Library of the city of Tucson is also open to the use of the students of the University. This

*Donated.

library is the depository of United States Government documents for the Territory of Arizona.

MUSEUM.

The Seventeenth Legislative Assembly of Arizona established a general museum at the University, to promote the collection of materials of all kinds illustrating the resources and development of Arizona, and particularly to preserve historical relics, including those pertaining to the aboriginal inhabitants. Donations of specimens and collections will be received and acknowledged with thanks, but no special provision has yet been made by the Legislature for the support of this department, aside from a small appropriation for the salary of a curator.

The professors of the University have the immediate care of the collections pertaining to their respective departments. The collections now displayed at the University comprise representative series of minerals, ores and rocks of Arizona. Among these may be particularly mentioned superb specimens from the mines of the Copper Queen at Bisbee. There are also collections of typical rocks and minerals for comparison, and many specimens of ores from different parts of the United States and from abroad. It is desired to make the collection of ores and minerals fully represent the great mineral resources of Arizona.

A large amount has been recently spent upon new cases for the Museum in its new quarters, and the material thus re-arranged and displayed in good light becomes doubly attractive and useful.

The Museum is indebted to Mr. Herbert Brown, curator, for a large and valuable collection of skins of the birds of Arizona, which he has deposited in the Museum, as well as for a collection of ancient aboriginal pottery and other relics. The fossil skull and teeth of an elephant and other fragmentary remains of extinct animals sent from Yuma by Mr. Brown deserve special mention.

Historical records of much value are gradually accumulating as a part of this Museum, and an appeal is made to old settlers and others to bear this fact in mind when making disposition of articles bearing even remote relation to the early pioneers of their history. All records and data of any nature that can be gleaned are worthy of preservation, and it is earnestly desired to have them placed at the University, where they will always be accessible for reference.

BIOLOGY.

The biological laboratories are located on the second floor of University Hall. They are convenient and well-lighted, and the equipment is such as is required for modern instruction and research in the biological sciences. The library and apparatus are well selected and adapted to the region and the courses offered.

The collections possessed by this department form a very important part of its equipment. The herbarium consists of 12,000 sheets of mounted plants, of which number 2,500 are included in the University botanical survey herbarium. The unique flora and fauna of the mountain, mesa and lowland collecting grounds, in close proximity to the institution, offer very attractive oppor-

tunities for instruction and research especially along ecological lines. The Desert Botanical Laboratory of the Carnegie Institution supplements in most admirable fashion the facilities of the University for investigation.

In addition to the above there are fifty cases of insects, a large case of seeds, articulate and disarticulate human skeletons, plaster and papier-mache models of the important structures of the human anatomy, and duplicate material for study and dissection.

CHEMISTRY.

The chemical laboratories used for instruction are two in number. That used by beginners in the study of general chemistry and qualitative analysis is on the second floor of University Hall, and is equipped for the experimental and theoretical study of chemical science.

The laboratory for quantitative analysis is on the first floor of University Hall. It is thoroughly equipped for the teaching of volumetric and gasometric analysis, blow-pipe analysis, metallurgical chemistry, and wet and fire assaying, including apparatus for the electrolytic determination of metals.

The balance room contains analytical and bullion balances of the latest model so arranged as to insure a maximum of stability and accuracy. A lecture and demonstration room fitted with sinks, cabinets, etc., completes an equipment of apparatus and collections adequate for first-class instruction in both theoretical and practical chemistry.

The laboratories of the Agricultural Experiment Station occupy three rooms on the first floor. These are devoted to analytical work and chemical investigations

relating to agriculture. Though not intended for the use of students they are of incidental value to the instructors and students through the investigations which are here conducted.

MINERALOGY AND PETROGRAPHY.

The laboratory for quantitative analysis is used for determinative mineralogy and blow-pipe analysis. The laboratory is supplied with necessary apparatus for student work, including glass and wooden models for the study of crystallography, hand and reflecting goniometers for the measurement of the angles of crystals, a polariscope for the study of optical properties of minerals, and a type set of 600 minerals.

For the study of petrography the laboratory is supplied with a type set of rocks classified according to Rosenbusch's *Elemente der Gesteinlehre* with thin sections corresponding, four petrographic microscopes, a collection of oriented sections of minerals and apparatus for studying interference phenomena.

PHYSICS.

Three rooms on the first floor of University Hall are set apart for the teaching of physics. The facilities for experimental demonstration of all important phenomena are very complete. The lecture room is fitted with shutters so that it can be darkened. A beam of sunlight directed by a fine clock heliostat outside may be thrown steadily across the lecture table for experiments on light, or used in connection with the solar lantern for a variety of other work. Adjacent to the lecture room are the laboratories and the apparatus room. Both lecture room and laboratories are supplied with water and gas.

An eight-inch Willyoung induction coil with storage and X-ray accessories is used in the study of high-tension electricity. Through the generosity of the Honorable Mark J. Egan, of Clifton, the University added to its equipment for the study of electricity a fine imported set of miniature wireless telegraphy apparatus, capable of transmitting messages about two hundred feet.

This department also has a double dissolving arc-light Ideal stereopticon, which is used by various other departments of the University and for public lectures before the students.

MATHEMATICS.

Models are an important aid to the study of mathematics. The collection of the department includes thread models of about forty ruled surfaces of the third, fourth and sixth orders. These illustrate the theory of surfaces and are also valuable in the study of kinematics and linkages.

The Bulletin and Transactions of the American Mathematical Society, and the Encyklopedia der Mathematischen Wissenschaften are subscribed for by the University Library.

MINING ENGINEERING AND METALLURGY.

The Mill, or mining engineering and metallurgical laboratory is equipped for use by the students of metallurgy in connection with their work in testing ores as to their adaptability for treatment by different processes both on a large and small scale.

The chief features of the equipment are: A Blake crusher, 4 in by 7 in.; a Dodge crusher, 4 in. by 6 in.;

sampling rolls, 6 in. by 9 in.; a cone and burr sample grinder; a pebble mill with a capacity of about 15 lbs. at one charge; a laboratory Lightning crusher and a disc pulverizer. A 5-stamp mill, with 800 lb. stamps; a 3-stamp mill, with 250 lb. stamps; inside and outside amalgamated plates for the same; a 2 ft. clean-up pan; a 1 ft. amalgamation pan, and a 9 jar revolving agitator for testing samples of a few ounces; a No. 5 Wilfley table of the latest pattern, and a Hallett hand jig; a $1\frac{1}{2}$ ton cyanide plant for treating sands or dry crushed ore; two 150 lb. cyanide plants for treating smaller samples; a 3 ft. agitator; a 12 in., 6-chamber, flush plate and frame, washing filter press and pump for the same; a Sturtevant shaking screen; a Tullock ore feeder, a belt and bucket elevator, sampling plates, split samplers, a shaking screen, percolators, sizing screens from 1-mesh to 200-mesh, miner's pans, bateas, retorts, etc.

The power for operating this plant is furnished by a 30 h. p. Westinghouse induction motor, type C.

The assay laboratory is equipped with assay furnaces for crucible work, for scorifying and cupeling, and for retorting mercury from amalgam, besides all needed appliances for assaying by dry and wet method including electrolysis. The laboratory also has desks and fittings for the chemical work required in the metallurgical and mineralogical investigation and analysis of ores, in mineral fertilizers, and in qualitative tests of minerals.

CIVIL ENGINEERING.

The apparatus in this department has been chosen with a view of giving the student the greatest familiarity

with the theory, construction and use of those instruments and machines which observation has shown to be of universal adoption in practical civil engineering work and the allied lines in hydraulic and mining engineering. This apparatus embraces surveyors' and engineers' chains; standard field and pocket tapes; plain solar compasses and transits; mining transits; engineers' levels; stadia, level and transit rods; aneroid barometers; odometers, automatic water registers, hook-gauges; three forms of current meter; stop watch; meteorological instruments; drafting instruments; mechanical calculators; blue-print apparatus; a four and one-fourth inch astronomical telescope with equatorial mountings and accessories; celestial sphere; planimeter; a complete set of apparatus for testing cement; and an Olsen Universal testing machine of 100,000 pounds capacity.

MECHANICAL ENGINEERING.

This department has a drafting and recitation room in addition to the regular drawing rooms of the department of Mechanic Arts. In this room is the catalogue file containing the trade literature of about five hundred leading machinery manufacturers of the United States; the collection of working drawings consisting of over three hundred blue prints, and the sample collection of models, machine parts, valves, electric fittings, insulating materials, abrasives, etc.

The Mechanical and Electrical Laboratory, which occupies a large room in the new Pump House, is equipped for the study and operation of boilers, steam and gasoline engines, hydraulic and electrical machinery. Besides the machinery of the shop and mill which can

be used for experimental purposes and for study of machine design, the University has a 60 h. p. tubular boiler, 35 h. p. Atlas engine, a Duplex feed pump, a Cameron pump, a 3 h. p. and a 1-2 h. p. direct current electric motors, an injector, a 500 gallon fire pump and a 40 h. p. Fairbanks-Morse gasoline engine. A 300 gallon two-stage centrifugal pump in the University well and its electric motor serve as part of the equipment for mechanical engineering.

MECHANIC ARTS.

The Mechanic Arts building, provided largely through the generosity of the Copper Queen Consolidated Mining Company, has a total floor area of 7,900 square feet divided as follows: Power room and draughting room, each 1,200 square feet; wood-working shop, forge shop and machine shop, each 1,400 square feet; wash room, 600; model room, 400, and store room 300 square feet.

The entire building is well ventilated and lighted, from above as well as from the sides. The drafting room is heated by steam.

The wood shop is equipped with a full assortment of hand tools, six turning lathes, a Universal wood-working machine, a Whitney dimension sawing machine, a band saw, a Universal trimmer and a large grindstone with truing device.

The forge room contains twenty-four down-drought forges, twenty-four anvils, a combination shear and punch, a blacksmith's drill press and a full assortment of small tools and appliances. Blast is furnished by a No. 3 Sturtevant blower; the smoke and gases are removed by a 70-inch exhaust fan.

The machine shop contains one 24-inch Lodge and Shipley engine lathe with taper attachment, two 14-inch Lodge and Shipley lathes, one 14-inch Pratt and Whitney lathe with taper attachment, one 10-inch Reed speed lathe, one 16-inch Cincinnati shaper, one 24-inch by 6-foot Woodward and Powel planer, one Brown and Sharpe No. 2 Universal milling machine, one Brown and Sharpe No. 1 Universal grinder, one 24-inch Prentice Bros. drill press, one power hack saw, one drill grinder, one emery stand and one grinding attachment for the lathes. A 1½ ton portable crane and a 1-ton triplex chain hoist are used in handling the heavier work.

Each shop has its own tool room well arranged and supplied with small tools, gauges, measuring instruments, etc.

A large wash room, containing a hundred lockers, is supplied with basins and running water.

AGRICULTURE AND HORTICULTURE.

Because of the situation of the Territorial University the educational work in agriculture and horticulture has taken peculiar form, being largely conducted on the correspondence plan, particularly through the "Timely Hints for Farmers" issued under the auspices of the Experiment Station, but of distinct educational value. Three thousand farmers of the Territory are reached more or less regularly by timely publications on subjects of vital interest. Farmers' Institutes, announcements of which are made from time to time, take the form of short courses in agriculture.

Small and well selected agricultural libraries of slight cost have been forwarded to a considerable number who have expressed a willingness to receive them.

It is believed that this method of dealing with our situation will become increasingly useful.

The equipment for agricultural instruction is good, consisting of an excellent seed collection, a green-house and gardens for experimental purposes containing many rare and interesting plants, and a well selected agricultural library.

GYMNASIUM.

Herring Hall, the new gymnasium, is fully equipped for the purposes of the department of physical training and athletics. The apparatus is of standard make, and includes forty chestweights, dumb-bells, bar-bells, wands, Indian clubs, a Medart vaulting horse, parallel-bars, a horizontal bar, a quarter-circle, an abdominal chair, wrestling machine, wrist machine, finger machine, chest expander, chest developer, climbing rope, flying rings, traveling rings, striking bag and drum, jump and vaulting stands, fencing foils and masks, basket balls and goals, five large mats and a set of anthropometric apparatus.

In the basement are located ninety-six lockers and five shower baths, which are supplied with hot water from a heater with large reservoir.

In connection with this equipment are the base ball and foot ball field, and four fine tennis courts.

During the past year a gallery was built across the west end of the gymnasium, with a seating capacity of about one hundred and fifty, thus increasing the convenience and usefulness of this building.

MILITARY.

Room O is used as an armory. It is fitted up with the necessary gun racks and accessories. The equipment includes 150 old style Springfield rifles, 100 Krag-Jorgensen rifles with complete accoutrements, eight sabres and belts, musical instruments for the band and signal flags. A large clear area south of the Library building is kept leveled and smooth for a drill ground and parade ground. At the rear of the Mill building are the targets for short range practice.

GENERAL ORGANIZATION.

I. College of Agriculture and Mechanic Arts.

In the College are offered courses leading to the following degrees :

1. Bachelor of Philosophy.
2. Bachelor of Science.
 - b. In Civil Engineering.
 - c. In Mechanical Engineering.

II. The School of Mines.

A four-year course leading to the degrees of :

1. Bachelor of Science in Mining.
 2. Bachelor of Science in Metallurgy.
- The Bureau of Mines and commercial assaying.

III. The Agricultural Experiment Station.

IV. The Sub-Collegiate Department of Manual Training.

English, scientific and classical subjects.
Manual training and domestic science.
Bookkeeping, stenography and business practice.

COLLEGE OF AGRICULTURE AND MECHANIC ARTS.

The courses offered in the College of Agriculture and the Mechanic Arts provide both a liberal training along literary and scientific lines and technical training along engineering, mechanical and agricultural lines. Great latitude of election is given in the literary and scientific courses, but the courses in engineering are more rigid in their requirements. Full details of the various courses follow. The aim in all is to combine the practical with the theoretical in instruction. The needs of a young and growing commonwealth are kept in mind, and a steady attempt is made to develop the adaptability and resourcefulness so necessary to meet the changing conditions.

ARIZONA SCHOOL OF MINES.

The School of Mines is designed for the education and training of young men in the arts and sciences directly involved in the industries of mining and metallurgy. Especial attention is given to the sciences of mathematics, physics, chemistry, mineralogy, geology and their applications. The Bureau of Mines and Assaying, while not directly connected with the work of instruction, affords with its laboratory and the influx of new material, a valuable object lesson to the advanced students of mining and metallurgy.

REGISTRATION.

All students are expected to register on registration day at the beginning of the year and at the beginning of the second semester, in the University office or in such rooms as may be designated on that day. Before making choice of elective subjects the student should in every case confer with the instructors concerned and with the committee on registration. A matriculation fee of \$5.00 is required of all students upon entering the University. No student will be considered registered until the matriculation fee has been paid. This fee is paid once and is not required for future registration. After registration no change in classes can be made without the consent of the committee on registration.

Students entering from other institutions should present to the committee certified copies of their records in such schools, together with certificates of graduation or of honorable dismissal. A copy of the school catalogue or course of study should be furnished with the credentials, in order to facilitate the work of the committee.

TUITION.

Tuition is free to students of Arizona. For all non-resident students, tuition is \$10 for each semester. No reduction will be made for late registration or early withdrawal.

RECORDS.

The class standing of each student is determined by the instructor in charge. The method of ascertaining the student's record is left to the instructor, and his report in all cases is final.

DISCIPLINE.

The disciplinary policy of the University in all its departments is based upon the assumption that the stu-

dents are young gentlemen and young ladies who come to the institution with a high determination to utilize to the full the opportunities offered, and with a keen sense of duty, honor and courtesy to each other and to the faculty. Formal and explicit prohibitions and rules are few, but those will be rigidly enforced, with adequate penalties, and good order and discipline maintained. The University is a civil, rather than a military community, and such privileges as will not be abused will be allowed all classes of students. In aggravated cases, such as cheating in University work, frequenting saloons, gambling houses, and other objectionable places, and serious breaches of peace or order, the faculty will not hesitate to proceed to the extreme measure of expulsion. In case of expulsion the student is required by regulations of the Regents and faculty to leave the campus immediately, and by Territorial statute to surrender his cadet uniform to the University. In all matters of discipline the faculty and President will strive for fairness, equity and efficacy rather than uniformity.

Students or classes desiring to make requests of the faculty should file their petition in the President's office before the hour of faculty meeting; class petitions must be presented at least two days before the time of meeting.

VACATIONS AND HOLIDAYS.

A short recess (see calendar, page 2) is taken at Christmas time. The long summer vacation begins about June first and continues until the middle of September. The Thanksgiving recess extends from the close of the regular exercises on the Wednesday before Thanksgiv-

ing to the next Monday morning. During the spring of the past three years the cadet companies have made a practice march of from three to seven days, which constituted in reality a third vacation for the preparatory department and for freshmen. All legal holidays are observed by the cessation of ordinary University work.

Arbor day has been formally adopted by the University Regents as the regular anniversary on which shall be celebrated the founding of the institution, in connection with the ceremonies of tree planting.

LIVING ACCOMMODATIONS.

Provision is made so far as possible for furnishing board and rooms to students of both sexes upon the University grounds. Young men have comfortable quarters in South Hall, which can accommodate about seventy-five students, two in a room, and in North Hall (for college men only), which can accommodate thirty-five students. West Cottage, the home of the young ladies, is in charge of an experienced and capable preceptress who has constant supervision of those rooming there.

All dormitories are lighted by electricity. Rooms contain a clothes press, and are provided with single bedsteads, table, chairs, mirror, wash-bowl, pitcher and slop-jar. Students will supply their own mattresses, pillows, sheets, blankets, towels, rugs and brooms, and such other articles as they may desire for ornamenting their rooms. They will care for their own rooms under the direction of the head of the dormitory. The Dining Hall of the University has accommodations for one hundred students. It is under the management of a paid

steward who is responsible to the President and the Board of Regents. While the charge for board is very low, it is the aim of the management to serve substantial, wholesome, appetizing meals. All students having rooms in the dormitories are required to take their meals at the Dining Hall. Students and members of the faculty, who reside outside the dormitories, may board at the Dining Hall.

FEES AND EXPENSES.

	Lowest.	Highest.
Tuition free to students from Arizona....		
Tuition, students, non-resident in Arizona, each semester	\$10.00	\$10.00
Maintenance fee (deposit) by students in men's dormitory	3.00	3.00
Maintenance fee (deposit) by male students residing in town.....	1.00	1.00
Mining excursions for advanced students,	20.00	40.00
Laboratory and shop fees, varying according to courses, per annum.....	2.00	30.00
Military uniforms	16.25	24.00
Books, per annum	5.00	20.00
Board, per month.....	17.00	20.00
Lights per room, per month.....	.50	1.50
Napkins50	.50

By resolution of the Board of Regents of the University, board is to be paid in advance on the first of each month. If tickets for the Dining Hall are not purchased before the third of each month, \$18.00 instead of \$17.00 will be charged for the month's board. Checks and postoffice or express money orders should be made

payable to the President. No reduction in the bill for board will be made for absence for a period less than one week, except by special arrangement at the office.

Text-books may be obtained directly from the publishers through a book association managed on the co-operative plan under the direction of the faculty. Members of the cadet companies will be required to provide themselves with the prescribed uniform, which will be ordered by the University. The cost of the cadet gray, woolen uniform, which must be deposited in advance, averages about \$16.25. This uniform has shown better wearing qualities than a civilian suit of equal cost, and parents are urged to consider the matter of uniform when supplying their sons with clothing for the approaching University year. It may be worn on all occasions, and thus will remove the necessity for additional expenditure for outer clothing other than overcoats. When the warm weather of spring comes, the students are expected to purchase the regulation khaki uniform and campaign hat, the total expense being about \$7.

The University has at present no loan funds with which to aid students who must earn their way. Various positions about the grounds, buildings and laboratories of the University, paying from \$4 to \$20 per month, are filled by students who must be self-supporting. The number, however, is not large, and preference is given to students from Arizona and to those who have spent time enough in the University to demonstrate that they are earnest, capable, reliable young men, likely to do this outside work and at the same time maintain a good record as students.

The Philo Sherman Bennett scholarship was constituted by the gift of \$500 to the University in 1905, through the agency of Mrs. William Jennings Bryan, to be used in aiding young women to secure an education. The income will be awarded to a deserving applicant in the year 1907-8.

REQUIREMENTS FOR ADMISSION.

Applicants for admission to any department of the University will be required to furnish satisfactory evidence of good moral character, and a certificate of graduation or of honorable dismissal from the schools with which they were last connected.

For admission to the Freshman class, applicants must be at least sixteen years of age and must satisfy requirements in subjects sufficient to give sixteen credits as described below. A credit is understood to be the equivalent of one study pursued satisfactorily for one year, one period a day, as ordinarily taught in high schools.

Students coming from approved high schools, and presenting a detailed official statement of work completed from the principals of such schools, will be excused by the committee on registration from entrance examinations in those subjects covered by the credentials, with the exception of English composition. Other students will be required to pass the entrance examinations.

For admission to the course leading to the degree of Bachelor of Philosophy, the subjects and credits assigned each are :

English	4	Latin	3
Mathematics	2	Greek, French, German	
History and Civics.....	2	or Spanish	2
Science	1	Elective	2

For admission to the course leading to the degree of Bachelor of Science, including the degrees of Bachelor of Science in Mining Engineering, Civil Engineering, Mechanical Engineering, Metallurgy, or Agriculture, the subjects and credits assigned each are:

English	4	French, German or Span-	
Mathematics	4	ish	2
History and Civics.....	2	Science(Physics required)	3
		Elective	1

The scope of work required in these various subjects is as follows:

ENGLISH—(a) English classics. An acquaintance with the works named below. These works are divided into two classes, those intended for thorough study and those intended for general reading. The portion of the examination devoted to the former class will be upon subject matter, form and structure. In addition, the candidate may be required to answer questions involving the essentials of English Grammar, and the leading facts in those periods of English literary history to which the prescribed books belong. In the portion of the examination devoted to the latter class, the candidate will be required to present evidence of a general knowledge of the subject matter, and to answer simple questions on the lives of the authors. The form of examination will usually be the writing of a paragraph or two on each of several topics, to be chosen by the candidate from a considerable

number—perhaps ten or fifteen—set before him in the examination paper. The treatment of these topics is designed to test the candidate's power of clear and accurate expression, and will call for only a general knowledge of the substance of the books. In preparation for this part of the requirement, it is important that the candidate shall have been instructed in the principles of writing English. A knowledge of grammar is presupposed. (b) English composition. This requirement can be met only by examination of the candidate or by his presenting satisfactory composition books of themes certified by a former teacher as original uncorrected work. The examination will take the form of a theme of five hundred words on some subject familiar to the candidate and will be a practical test of his ability to express himself in writing clearly and consecutively. No candidate will be accepted whose work is notably defective in point of neatness, spelling, punctuation, idiom, or division into paragraphs. Those found lacking in composition will be required to make good the deficiency at once in a special class organized for that purpose.

No student will be admitted without examination, except on the certificate from his former instructors that the entire requirement has been fulfilled. Substantial equivalents, properly certified, will be accepted.

For thorough study: For 1907, Shakespeare's *Julius Cæsar*; Milton's *L'Allegro*, *Il Penseroso*, *Comus*, *Lycidas*; Burke's *Speech on Conciliation with America*; Macaulay's *Essays on Johnson and Addison*.

For general reading: For 1907, Shakespeare's *Merchant of Venice* and *Macbeth*; the *Sir Roger de Coverly*

Papers in "The Spectator;" Irving's *Life of Goldsmith*; Coleridge's *Rime of the Ancient Mariner*; Scott's *Ivanhoe*; Carlyle's *Essay on Burns*; Tennyson's *Idylls of the King*; Lowell's *Vision of Sir Launfal*; George Eliot's *Silas Marner*.

MATHEMATICS—Arithmetic as covered in White's *Advanced Arithmetic* to the appendix, but these subjects will be omitted in the entrance examinations: longitude and time, present worth, stock investments, exchange, equation of payments, compound proportion, partnership and cube root, Algebra, through quadratic equations, as given in Wells' *Essentials of Algebra* or Wentworth's *New School Algebra*. Plane geometry as treated in the latest editions of Wentworth or Wells. For students in the scientific or engineering courses, solid geometry and trigonometry, each requiring a half-year of work, will be required.

GENERAL HISTORY AND CIVICS—As much as is included in Adams's *European History*; Hinsdale's *American Government*, or Hart's *Actual Government*, together with Channing's *Student's History of the United States*, or Montgomery's *Student's American History*, or text books covering equivalent ground. To meet these requirements a large amount of reference work is expected. In place of general history the following will be accepted: History of Greece and Rome as contained in Myers' histories of Greece and Rome, or an equivalent; and Coman and Kendall's or Larned's *History of England*.

*GREEK—As covered by Gleason and Atherton's *Beginners' Greek Book*; Xenophon's *Anabasis*, four

*If any language is offered it must be to the extent of two credits, since a single year's study of a language is not considered of sufficient educational value to be entitled to credit.

books; Homer's *Iliad*, three books, with composition and the use of Hadley and Allen's, or Goodwin's *Greek Grammar*.

*LATIN—As covered by Collar's *First Latin Book* and *Viri Romæ*, together with Allen and Greenough's *Grammar* and texts; sight reading; Cæsar, four books, or an equivalent; Cicero, four orations; Virgil, six books; sight reading from Nepos, Cicero and Gellius; Daniell's or Bennett's *Prose Composition*.

*GERMAN—As covered by Thomas' *German Grammar*, with readings outlined for German 1, 2, 3, 4, or an equivalent.

*SPANISH—As covered by Hills and Ford's *Spanish Grammar* with readings, etc., outlined for Spanish 1, 2, 3, 4, or an equivalent.

*FRENCH—As covered by Fraser and Squair's *French Grammar* (Parts I and II) with readings, etc., outlined for French 1, 2, 3, 4, or an equivalent.

SCIENCE—Under this head may be offered the required number of credits in the following subjects: physical geography, physiology, botany, chemistry, physics or elementary astronomy. At least half the preparation in science should consist of laboratory work. Note-books, containing such laboratory work as has been performed by the student, should be presented for examination.

ELECTIVE—The remaining credits required may be made up from additional subjects ordinarily taught in high schools.

*If any language is offered it must be to the extent of two credits, since a single year's study of a language is not considered of sufficient educational value to be entitled to credit.

Students from other institutions of equivalent rank may be admitted to classes higher than freshman upon presentation of properly authenticated certificates showing to the satisfaction of the faculty that they are qualified to proceed with their required work. These certificates must be accompanied by statements of honorable dismissal, or leave of absence.

By arrangements with the Arizona Normal School at Tempe, and the Northern Normal School at Flagstaff, students from these institutions will be received into the University without examination, and given credit for all work which is the equivalent of courses offered by the University either for admission or for a degree. Students from this University may also obtain the equivalent privilege at the Normal Schools by presenting the proper certificate of standing, signed by the president.

The faculty desires to establish such relations with high schools and other educational institutions as will enable it to accept their certificates without question. To this end presiding officers are respectfully requested to correspond with the President.

COURSES OF STUDY AND DEGREES.

All facilities and privileges of the University are open to qualified persons of both sexes.

The University offers four-years courses of study leading to the degrees of Bachelor of Philosophy and Bachelor of Science, and to those degrees specialized as shown on pages 48-49. In each course the work is partly required and partly elective, as described by schedules later. Each student doing full work is required to take not less than sixteen hours of class room work per week. In laboratory work a period from two to three hours is considered the equivalent of one recitation hour.

Persons of mature age and with sufficient preparation, who are not candidates for degrees, may be admitted to regular classes as special students, provided, however, that in all such cases they show to the satisfaction of the instructors in charge that they can take the course with profit to themselves and without detriment to the regular class. It is expected that those who desire thus to specialize in mineralogy, assaying, geology or surveying, will have had at least a high school education, or its equivalent, particularly in English, algebra, geometry, physics and chemistry.

The faculty reserves the right to omit classes in any course of instruction unless a suitable number of students register for the course.

Students who have completed satisfactorily the required work, and the specified amount of elective work, as shown in the accompanying schedules, will be given the degree of Bachelor of Philosophy or Bachelor of Science. The special character of any course of study may be indicated by adding to the degree the name of the department, as: Bachelor of Science in Mining Engineering, or Bachelor of Science in Metallurgy.

Military science and tactics or, for women, physical culture, is required during the Freshman and Sophomore years. If for any reason a student is excused from these exercises, an additional subject having a minimum of three recitation hours per week will be required.

Credit toward degrees is given by means of a unit system which assigns to each course of instruction offered a certain number of units of credit. A unit ordinarily represents one class-room hour per week, or its equivalent of two or three laboratory hours, for one semester. One hundred and twenty-eight units besides six units in military science and tactics and physical culture, are required for obtaining a degree in any course.

Any candidate for a degree may present as part fulfillment of requirements for graduation an acceptable thesis embodying the result of a special study of some subject within the range of the course pursued. The subject of the thesis must be submitted for the approval of the faculty at the opening of the Senior year, and the completed thesis must be presented not later than three weeks before commencement day. The credit value will be determined by the faculty at the time the subject is approved.

GROUPS OF COURSES.

General—English, Mathematics.

Group A—Latin, Greek, French, German, Spanish.

Group B—History, Economics, Philosophy, Sociology, Domestic Science.

Group C—Astronomy, Botany, Chemistry, Geology, Mineralogy, Physics, Zoology.

Group D—Civil Engineering, Mechanics Arts, Mechanical Engineering, Metallurgy, Mining Engineering.

The units necessary for the different degrees are as follows :

BACHELOR OF PHILOSOPHY.

a Required—English, 24 ; Philosophy, 15 ; History and Economics. 8.

b Group Elective—From Group A, 32 ; Group C, 16.

c Free electives—33.

BACHELOR OF SCIENCE.

a Required—English, 8 ; Mathematics, 16.

b Group Electives—From Group B, 4 ; Group C and D, 56.

c Free electives—44.

For the degrees of Bachelor of Science in Mining Engineering, Metallurgy and Civil Engineering, the same work is required in all for the first two years, with differentiation during the third and fourth years, as shown on the following pages.

Mining Engineering, Metallurgy, Civil Engineering,**First year.**

English, 1, 2	6 units
Mathematics, 1, 2	10 "
Chemistry, 1, 2	8 "
Mech. Arts, 1, 2, 3, 4	<u>8</u> "
	32 "

Second year.

Mathematics, 3, 4	6 units
Physics, 1, 2	8 "
Chemistry, 3, 4	8 "
Mech. Arts, 5, 6	4 "
Civil Eng., 1, 2	<u>8</u> "
	34 "

Mining Engineering.**Third year.**

Mathematics, 5, 6	9 units
Mineralogy, 1, 2	7 "
Geology, 1, 2	8 "
Civil Eng., 5, 6	<u>8</u> "
	32 "

Fourth year.

Mining Eng., 1, 2	8 units
Geology, 3, 4	6 "
Metallurgy (lect.)	3 "
Civil Eng., 10	4 "
Mineralogy, 3, 4	4 "
Mech. Eng., 1, 2	<u>6</u> "
	31 "

Metallurgy.**Third year.**

Mathematics, 5, 6	9 units
Mineralogy, 1, 2	7 "
Geology, 1, 2	8 "
Chemistry, 5, 6	<u>8</u> "
	32

Fourth year.

Metallurgy, 1, 3,	
4, 5, 6	13 units
Mining Eng., 1	4 "
Civil Eng., 5, 6 or 10	8 "
Mech. Eng., 1, 2	<u>6</u> "
	30

Civil Engineering.

Third year.		Fourth year.	
Mathematics, 5, 6	9 units	Civil Eng., 7, 8	8 units
Civil Eng., 5, 6	8 "	" " 10	4 "
" " 4	1 "	Mech. Eng., 1, 2	6 "
" " 9	4 "	Elective	<u>12</u> "
" " 12	2 "		30
Mineralogy, 1	4 "		
Physics, 4	<u>4</u> "		
	32		

Mechanical Engineering.

Second year.

Mathematics, 3, 4	6 units
Physics, 1 2	8 "
Mech. Arts, 5, 6	4 "
Mech. Eng., 3, 4	6 "
Civil Eng., 1, 2	<u>8</u> "
	32

Third year.

Fourth year.

Mathematics, 5, 6	9 units	Mech. Eng., 5, 6	8 units
Civil Eng., 5, 6	8 "	" " 7, 8	8 "
Mech. Eng., 1, 2	6 "	Civil Eng., 10	4 "
Physics, 3, 4	7 "	Elective,	<u>10</u> "
Mech. Arts, 7, 8	<u>4</u> "		30
	34		

COURSES OF INSTRUCTION.

Courses having odd numbers are given in the first semester; those having even numbers, in the second semester. The hours mentioned show the number of periods per week. The subjects are arranged alphabetically.

ASTRONOMY.

PROFESSOR DOUGLASS.

The wonderful atmosphere of Southern Arizona is the best in the United States for astronomical observation, because it has a smaller percentage of cloud and a lesser average wind velocity than any other locality where records have been preserved. The dry air and 2400 feet elevation give Tucson such a clear sky that faint stars may be watched till they set behind the distant horizon. The fine weather, day after day, gives opportunity for a consecutiveness of observation not obtainable elsewhere. A greater portion of the year is available, with less interference from air currents. This certainty of having clear weather at any given time is of the utmost importance.

The course in Astronomy is arranged especially to draw attention to these advantages, and, at the same time, to give that understanding of the motions of the earth and planets which is so important in many branches of engineering. The four and one-fourth inch Brashear telescope of the University will always be available for

closer study of the heavenly bodies. An excellent clock with electric connections for transmitting time gives opportunity for longitude, latitude and time observations. It is hoped in the coming year to install other instruments that will take advantage of the exceptionally favorable conditions so peculiar to Arizona.

ASTRONOMY 1, 2. DESCRIPTIVE ASTRONOMY—The study of the sun, moon and planets and other celestial objects, with constant views of their telescopic appearance and discussion of the latest theories of the evolution of the universe and the condition of the planets. This course will include some research work for which the admirable climate affords opportunity. Open to all students. 3 hrs., or an equivalent, both semesters. 6 units.

BIOLOGY.

PROFESSOR THORNBUR, MISS TILLMAN.

The courses which follow are calculated to articulate with the work done in biology in the average western high school.

The Desert Botanical Laboratory of the Carnegie Institution of Washington, D. C., is located in the mountains just west of Tucson. In this laboratory, the southwest with its unique and, as yet, little investigated flora, gains what is destined to be one of the important centers of active, scientific research. The research facilities of the laboratory are all that could be desired, and the investigations upon the desert flora will appeal to students of botany from all quarters. In the light of the above, the importance of the Desert Botan-

ical Laboratory to the University of Arizona and especially to the department will be apparent.

BOTANY, 1, 2. GENERAL BOTANY—Botany 1 treats of the general principles of the histology and physiology of plants. Botany 2 completes the year's work with a general survey of plant types from Protophyta to Spermatophyta. Guide, Bessey's *Essentials of Botany* supplemented with lectures. Laboratory studies will form the basis of all the work. Open to all students. 4 hrs., or an equivalent, both semesters. 8 units.

BOTANY 3, 4. ADVANCED BOTANY—The second year's work is not definitely outlined, but it is purposely left open to be formulated as the needs of the students applying appear to demand. Courses in general morphology of the fungi, histology, physiology, and the taxonomy and ecology of the native flora are offered here. Opportunities are offered for research work. Open to all students who have taken Botany 1, 2. 4 hrs., or an equivalent, both semesters. 8 units.

ZO-LOGY 1, 2—Conducted along lines corresponding very closely to those followed in Botany 1, 2. Laboratory studies as in that course are made the main feature of the work. In the study of the Mammalia constant reference is made to human anatomy. Textbook, Parker and Hazwell, *Manual of Zo-ology*. Open to all students. 4 hrs., or an equivalent, both semesters. 8 units.

CHEMISTRY.

PROFESSOR GUILD, ASST. PROF. BENNER.

The instruction in chemistry has two main objects in view; first, to promote general culture; and secondly,

to introduce students to technical work, especially in mining. The first two years' work in general chemistry, qualitative and quantitative analysis, places the student in a position to take up advantageously the study of mining, agricultural chemistry or metallurgy.

CHEMISTRY 1, 2. Lectures and recitations illustrating the chemical properties of the elements and their compounds. Text-books, Newth, *Inorganic Chemistry*, Eliot and Storer, *Qualitative Analysis* and various reference books. Open to all students who have taken courses amounting to one year each in preparatory chemistry and physics. 4 hrs., or an equivalent, both semesters. 8 units.

CHEMISTRY 3. QUANTITATIVE ANALYSIS—Laboratory practice with lectures and recitations; the work will be chiefly in gravimetric methods of analysis. Open to students who have taken Chemistry 2. 4 hrs., or an equivalent, first semester. 4 units.

CHEMISTRY 4. VOLUMETRIC ANALYSIS—A continuation of the work in Chemistry 3, special attention being given to the methods of assaying employed in the West. 4 hrs., or an equivalent, second semester. 2 units, if discontinued March 15th; otherwise, 4 units.

CHEMISTRY 5, 6. SPECIAL QUANTITATIVE ANALYSIS—The analysis of water, gases, oils, minerals. Open to students who have taken Chemistry 4. 4 hrs., or an equivalent, both semesters. 8 units.

*CHEMISTRY 7, 8. ORGANIC CHEMISTRY—Lectures on the carbon compounds; laboratory work in organic analysis and the preparation of organic compounds; vapor density and molecular weight determination. Open

*Omitted 1906-7.

to students who have taken chemistry 3, 4. 4 hrs., or an equivalent, both semesters. 8 units.

*CHEMISTRY 9. SYNTHETIC CHEMISTRY—The preparation of pure chemical compounds from the crude mineral products. Open to students who have taken Chemistry 4. 2 hrs., or an equivalent, first semester. 2 units.

*CHEMISTRY 10. PHYSICAL CHEMISTRY—Lectures. Historical introduction leading up to a discussion of modern chemical theories. Open to students who have taken Chemistry 3. 2 hrs., second semester. 2 units.

CHEMISTRY 11, 12. CHEMISTRY OF THE RARE ELEMENTS—The analysis and synthesis of uranium, molybdenum, tungsten, vanadium and cerium compounds. Open to student who have taken Chemistry 6 and 9. 4 hrs., or an equivalent, both semesters. 8 units.

CIVIL ENGINEERING.

PROFESSOR HOUSTON, MR. CHAPIN, MR. BARTHELIS.

The courses in this department have been arranged with special reference to the engineering development of the Southwest. Especial stress will be laid on surveying, railroad and bridge work, and irrigation engineering. The design throughout the courses is to give the student a thorough and practical knowledge of the essential principles of his profession, and to teach the technical practice of the times so far as possible without sacrificing in other directions. Engineering practice changes from year to year and a graduate who is thoroughly grounded in the principles of his profession will readily acquire the technical side.

*Omitted 1906-7.

CIVIL ENGINEERING 1, 2. SURVEYING—Use and care of instruments, including plane and solar compasses, levels, transits; plane land surveying; United States system of land surveys; city, topographical and mine surveying; earthwork computations; determination of azimuth, latitude, longitude and time by observations on the circumpolar stars and on the sun. One full half-day each week is devoted to field practice; plots are made of field surveys and a topographic map of some area in the vicinity of Tucson is executed by each student. Lectures, recitations, drawing and fieldwork. Textbook, Raymond, *Surveying*. Open to students who have taken trigonometry. 4 hrs., both semesters and Saturday forenoons. 8 units.

*CIVIL ENGINEERING 5. GEODESY—Size and shape of the earth; latitude, longitude and azimuth formulas; base line apparatus; trigonometric leveling. Lectures and fieldwork. 1 hr., second semester. 1 unit.

*CIVIL ENGINEERING 5. MATERIALS OF CONSTRUCTION—Their properties, preparation and use; stone, brick, lime, cement, concrete, timber, iron and steel. Lectures, recitations and laboratory work. 4 hrs., first semester. 4 units.

*CIVIL ENGINEERING 6. MASONRY CONSTRUCTION—Foundations on land and in water, cofferdams, cribs, caissons, round and sheet piling, bridge piers and abutments, retaining walls, dams, arches, the theory and practice in reinforced concrete construction. Graphical methods of determining stability. 4 hrs., second semester. 4 units.

*Omitted 1906-7.

CIVIL ENGINEERING 7, 8. MODERN FRAMED STRUCTURES—Stresses in the various types of bridges under different systems of loading; graphical investigation of stability of arches and retaining walls; complete design with drawings for a plate girder bridge, and a steel frame building. Text-book, Merriman and Jacoby, *Roofs and Bridges*. 4 hrs., both semesters. 8 units.

CIVIL ENGINEERING 9. RAILROAD ENGINEERING—Preliminary and location surveys; simple and easement curves, turnouts and switches; principles of economic location as based upon cost of construction, operating expenses, alignment, and grades; maintenance-of-way. The fieldwork consists of the surveys for a railroad of sufficient length to secure familiarity with the methods of actual practice. Each student makes a complete set of notes, maps, profiles, calculations and estimates of cost. Open to students who have taken Engineering 1, 2. 4 hrs., until December; one hour and Saturdays through December and January. 4 units.

CIVIL ENGINEERING 10. HYDRAULICS—Velocity and discharge from orifices, weirs, tubes and pipes; flow in sewers, ditches, canals and rivers; measurement of water power; water wheels of various types. Text-book, Merriman, *Hydraulics*. 4 hrs., first semester. 4 units.

*CIVIL ENGINEERING 11. PRINCIPLES OF IRRIGATION—A study of the present condition of irrigation development in the United States; irrigation legislation; methods of establishing rights to water; a brief reference to the engineering principles relating to the construction and maintenance of canals and reservoirs and the various

*Omitted 1906-7.

means of diverting and measuring water for use in irrigation. Prerequisite, Engineering 2. 2 hrs., second semester. 2 units.

ECONOMICS.

PRESIDENT BABCOCK.

ECONOMICS 1, 2. A study of the general principles and laws of economics based upon Seager, *Introduction to Economics*. Special attention is given to the study and criticism of socialism, and the problem of municipal and government ownership of natural monopolies and public utilities. 3 hrs., both semesters. 6 units.

*ECONOMICS 3, 4. A general study of the history and theory of Economics based upon Marshall, *Principles of Economics*, with lectures and required reading. This course aims to acquaint the students with the different modern theories, and economic plans for reform. 3 hrs., both semesters. 6 units.

ENGLISH.

PROFESSOR NEWSOM, MISS LUTRELL.

The purpose of the courses outlined below is to give a general knowledge of English literature from the fourteenth century to the present time. Chief stress is placed upon the study of the leading authors of the most important periods, though the history of our literature is also traced from age to age. The course in composition aims to develop accurate thought and clear, vigorous expression.

ENGLISH 1 and 2. COMPOSITION—Prescribed for all freshmen. *First Semester:* Short weekly themes

*Omitted 1906-7.

corrected and rewritten. Selected readings from English and American writers of prose, with written and oral reports.

Second Semester: Fortnightly themes illustrating methods in narration, description, exposition and argumentation. Hill's *Beginnings of Rhetoric and Composition*, supplemented by lectures. Selected readings and reports thereon as in the first semester. 3 hrs., both semesters. 6 units.

ENGLISH 3, 4. NINETEENTH CENTURY PROSE—Primarily for freshmen. From the publication of the Lyrical Ballads to the death of Ruskin (1798-1899.) This course deals with the following writers: Scott, Coleridge, Lamb, Landor, Austen, Hazlitt, DeQuincey, Carlyle, Macaulay, Newman, Thackeray, Dickens, Eliot, Ruskin, Matthew Arnold. Weekly papers on assigned topics, lectures and discussions. 2 hrs., both semesters. 4 units.

ENGLISH 5, 6. SHAKESPEARE—For juniors and seniors. The following plays are read: *Midsummer Night's Dream*, *Romeo and Juliet*, *Henry V*, *Merchant of Venice*, *As You Like It*, *Twelfth Night*, *Hamlet*, *Othello*, *Lear*, *Macbeth*, *Timon*, *Tempest*. Some attention is given to the development of the Elizabethan drama and to Shakespeare's formative period. At least one play is read from each of the following writers: Lyly, Greene, Peele, Kyd and Marlowe. Lectures and discussions and a thesis of not less than 1500 words. 3 hrs., both semesters. 6 units.

*ENGLISH[‡]7, 8. EIGHTEENTH CENTURY LITERATURE—For Sophomores. From the death of Dryden to the publication of the Lyrical Ballads (1700-1798.) This course deals with the following writers: Defoe, Swift, Addison, Steele, Pope, Johnson, Horace Walpole, Burney, Beckford, Goldsmith, Burke. Weekly papers on assigned topics, lectures and discussions. 2 hrs., both semesters. 4 units.

*ENGLISH 9, 10. SEVENTEENTH CENTURY LITERATURE—For juniors and seniors. This course deals with Bacon, Milton, Herrick, Donne, Bunyan and Dryden. Weekly papers on assigned topics, lectures and discussions, and a thesis of not less than 1500 words. 2 hrs., both semesters. 4 units.

†ENGLISH 11, 12. POETRY—For juniors and seniors. From the publication of Thomson's *Winter* to the death of Tennyson (1726-1992.) This course deals with the following writers: Thomson, Collins, Gray, Blake, Burns, Wordsworth, Coleridge, Scott, Byron, Shelley, Keats, Matthew Arnold, Browning, Tennyson. Weekly papers on assigned topics, lectures and discussions, and a thesis of not less than 1500 words. 2 hrs., both semesters. 4 units.

†ENGLISH 13, 14. CHAUCER—For sophomores and juniors. In this course a large part of the *Canterbury Tales* is read, the *Prologue to the Legende of Gode Wommen*, and some of the minor poems. The course is purely literary and a knowledge of Anglo Saxon is not required. 3 hrs., both semesters. 6 units. Miss Lutrell.

*Omitted 1906-7.

†To be given 1907-8.

DOMESTIC SCIENCE AND ART.

MISS TILLMAN.

The courses in Domestic Science and Art are planned for two classes of students: (1) Girls who wish to acquire a knowledge of the household arts in connection with other studies of the preparatory department. (2) College students who receive college credit for the work.

The course for the preparatory students is of a more practical nature, while the college course pays especial attention to the scientific principles underlying the work and pre-supposes the students to have had chemistry and at least one of the biological sciences.

The entire course has for its object the training of the student in the principles of science as applied to daily living, thus demonstrating the value of science, economics and ethics in the betterment of the home.

DOMESTIC SCIENCE 1, 2. FOOD ECONOMICS—The classification of food stuffs, nutritive and money values; the application of the principles of pure science to the problems of nutrition, dietary work, preservation and preparation. 2 hrs., or an equivalent, both semesters. 4 units.

DOMESTIC ART 3. TEXTILES—Lectures on textiles, production, properties, manufacture, etc. Laboratory work in hand sewing, drafting of patterns from simple measurements and plain sewing. 2 hrs., or an equivalent, first semester. 2 units.

DOMESTIC ART 4. HISTORY OF COSTUME—Lectures on the history of costume; the making of patterns from systems; designing, dressmaking, tailor pressing and

construction ; practical millinery. 2 hrs., or an equivalent, second semester. 2 units.

FRENCH.

PROFESSOR TURRELL, ASSISTANT PROFESSOR LIGDA.

FRENCH 1, 5. First Semester: Fraser and Squair, *French Grammar* (Part I), Aldrich and Foster, *French Reader*. Second Semester: Reading of Daudet, *La Belle Nivernaise*, Labiche and Martin, *La Poudre aux Yeux*, Halévy, *L'Abbe Constantin*. Composition and dictation, with drill on the irregular verbs. 5 hrs., both semesters. 8 units. Assistant Professor Ligda.

FRENCH 3, 4. First Semester: Fraser and Squair, *French Grammar* (Part II.) Merimée, *Colomba*, *Lamartine*, *Graziella* or *Jeanne d'Arc*, Feuillet, *Le roman d'un jeune homme pauvre*. Second Semester: Selected readings, as DeVigny, *Cinq Mars*, Canfield, *French Lyrics*, Victor Hugo, *Les Misérables*, etc. 5 hrs., both semesters. 8 units. Professor Turrell.

*FRENCH 5. THE CLASSICAL FRENCH DRAMATISTS. Reading of plays of Corneille, Racine and Moliere. Study of the history of French literature to the 19th century. 3 hrs., first semester. 3 units. Professor Turrell.

*FRENCH 6. HISTORY OF FRENCH LITERATURE IN THE 19TH CENTURY. Class reading of recent writers as Daudet, Dumas, Zola, Verlaine, Coppée, Rostand, etc. 3 hrs., second semester. 3 units. Professor Turrell.

GEOLOGY.

PROFESSOR TOLMAN.

The courses in Geology are constructed with special reference to the following: 1st, the development of the

*Omitted 1906-7.

observational faculties; 2nd, training in inductive and deductive reasoning whereby each student discovers for himself the causes for each phenomenon observed; 3rd, practical application of geological principles to mining with special training in structural geology and mapping.

GEOLOGY 1, 2. GENERAL GEOLOGY—Geological processes, their causes and effects. The atmosphere, surface and underground water, the ocean and the ice and snow as geological agents. Earth movements; mountain and continent building; vulcanism. Rocks, their origin and alterations. Structural geology (problems through the entire course.) Short review of the physical history of the earth and correlated life progress. Detailed study of ore deposits.

Geological excursions once a month. Laboratory work is given in connection with the study of rocks, structural geology and ore deposits. Open to students who have taken or are taking mineralogy 1, 2. 4 hrs. a week, both semesters. 8 units.

GEOLOGY 3, 4. TOPOGRAPHICAL AND FIELD GEOLOGY—Constructions of maps and sections. United States Geological Survey methods of geological mappings. Geological mine mapping and stenography. Two geological maps are required of each student, one of a portion of the Tucson mountains (composed of lava flows) and one of a district in the Rincon mountains (faulted and folded sedimentary rocks.) Prerequisite Geology 1, 2. All day Saturdays, both semesters. 6 units.

GERMAN.

PROFESSOR TURRELL.

GERMAN 1, 2. First Semester: Bacon, *New German Course*, complete. Second semester: Reading of easy texts, such as Andersen, *Bilderbuch ohne Bilder*, Storm, *Immensee*, von Hillern, *Hoher als die Kirche*, Gerstaecker, *Germalhausen*. Composition, dictation and continued grammar drill. 5 hrs., both semesters. 8 units.

GERMAN 3, 4. First Semester: Thomas, *German Grammar* (Part II.) Reading of Meyer-Foerster, *Karl Heinrich*, Heine, poems and *Die Reisebilder*, Lessing, *Minna von Barnhelm*. Second Semester: Goethe, *Hermann und Dorothea*, *Egmont*, Schiller, *Wilhelm Tell*, *Maria Stuart*. An outline of the history of German literature will be given during the year, using Bernhardt, *Deutsche Litteraturgeschichte*, with library readings. 5 hrs., both semesters. 8 units.

GERMAN 5. GERMAN LITERATURE IN THE NINETEENTH CENTURY. The Romanticists and their successors. Class reading of Kleist, *Der Prinz von Homburg*, Grillparzer, *Der Traum ein Leben*, etc. Lectures and library readings. 3 hrs., first semester. 3 units.

GERMAN 6. RECENT LITERARY MOVEMENTS IN GERMANY. The rise of naturalism and symbolism. Reading of Wildenbruch, *Harold*, Fulda, *Der Talisman*, Sudermann, *Johannes*, Hauptmann, *Die Versunkene Glocke*. 3 hrs., second semester. 3 units.

HISTORY.

PRESIDENT BABCOCK, MR. ———

In the work in history emphasis is placed on the social and political development, the relation of cause and effect, and the unity of history. The laboratory method is used whenever possible and individual work insisted upon.

*HISTORY 1, 2. ENGLISH HISTORY—Gardiner's *Students' History of England* is used as the basis for the work, with much assigned reading and the preparation of reports. Open to all students. 4 hrs., both semesters. 8 units.

*HISTORY 3, 4. AMERICAN COLONIAL HISTORY—A detailed study of the American colonies under Great Britain, and of the United States to the adoption of the Constitution. Lectures, assigned reading and reports. Open to students who have taken History 1, 2. 3 hrs., both semesters. 6 units.

HISTORY 5, 6. CONSTITUTIONAL HISTORY OF THE UNITED STATES—A detailed study of the formation of the Union and of the political and constitutional history of the United States down to 1856, based on letters and speeches of American statesmen, public documents and special histories. Open to students who have taken History 1, 2. 3 hrs., both semesters. 6 units. President Babcock.

LATIN.

MRS. NEWSOM.

The courses below are open to students who have completed the first three years of Latin in the sub-col-

*Omitted 1906-7.

legiate department, or an equivalent. Constant, thorough drills are given in technical grammar and prose composition. In reading, the matter is subjected to grammatical, metrical, rhetorical and historical explanation. The study of the text is made the means of mental discipline, of developing the faculties of observation and critical judgment, and of acquiring habits of thoroughness and accuracy.

LATIN 1, 2. Virgil, Books V and VI; Livy, selections; Cicero, *de Senectute*, *de Amicitia*. Exercises in prose composition. 4 hrs., both semesters. 8 units.

LATIN 3, 4. Tacitus, *Germania and Agricola*, selections from histories; Horace, *Odes*. 3 hrs., both semesters. 6 units.

MATHEMATICS.

PROFESSOR E. M. BLAKE, ASSISTANT PROFESSOR MED-CRAFT.

MATHEMATICS 1. COLLEGE ALGEBRA—Four hours per week. GRAPHICAL METHODS. One two-hour laboratory period per week. First semester. 5 units. Assistant Professor Medcraft.

MATHEMATICS 2. PLANE AND SPHERICAL TRIGONOMETRY—Four hours per week. GRAPHICAL METHODS. One two-hour period per week. Second semester. 5 units. Assistant Professor Medcraft.

Mathematics 1 and 2 are prescribed for first year students in Mining Engineering, Metallurgy, Civil and Mechanical Engineering. The work in graphical methods is supplementary to algebra and trigonometry and introductory to analytical geometry.

MATHEMATICS 3. ANALYTICAL GEOMETRY—Prerequisite, Mathematics 1, 2. 3 hrs., first semester (1907-8 only.) Professor Blake. Second semester (repeated.) Assistant Professor Medcraft. 3 units.

MATHEMATICS 4. DIFFERENTIAL CALCULUS—Prerequisite, Mathematics 3. 3 hrs., second semester. 3 units. Professor Blake.

Mathematics 3 and 4 are prescribed for second year students in Mining Engineering, Metallurgy, Civil and Mechanical Engineering.

MATHEMATICS 5. INTEGRAL CALCULUS—Prerequisite, Mathematics 4. 4 hrs., including one laboratory period, first semester. 4 units. Professor Blake.

MATHEMATICS 5. ANALYTICAL MECHANICS—Prerequisites, Mathematics 5 and Physics 1, 2. 5 hrs., including one laboratory period, second semester. 5 units. Professor Blake.

Mathematics 5 and 6 are prescribed for third year students in Mining, Civil and Mechanical Engineering.

NOTE—Beginning September, 1907, trigonometry will be a preparatory subject and analytical geometry a freshman subject; calculus will be given during the whole sophomore year; and analytical mechanics will occupy the whole junior year.

MECHANIC ARTS.

PROFESSOR HOLMES, PROFESSOR HENLEY.

The mechanic arts courses comprise the elements of drawing and shop work. The work consists of lectures, recitations, drawing, tool and machine work. The

courses are designed with special regard for the needs of the students in engineering.

MECHANIC ARTS 1. MECHANICAL DRAFTING—Lettering, tracing and blue printing. 3 two-hour periods a week, first semester. 2 units. Professor Holmes.

MECHANIC ARTS 2. DESCRIPTIVE GEOMETRY—Church's seventeen problems on lines and planes. 3 two-hour periods a week, second semester. 2 units. Professor Holmes.

MECHANIC ARTS 3. WOOD SHOP—Joinery, bench and lathe work, elements of pattern making. 2 three-hour periods a week, first semester. 2 units. Professor Henley.

MECHANIC ARTS 4. FORGE SHOP—Forge work in iron and steel, tempering, case hardening and annealing. 2 three-hour periods a week, second semester. 2 units. Professor Henley.

MECHANIC ARTS 5, 6. MACHINE SHOP—Bench and floor work, drill press, lathe, planer, milling machine, grinder, etc. 2 three-hour periods, both semesters. 4 units. Professor Henley.

MECHANIC ARTS 7, 8. ADVANCED SHOP WORK—Manufacturing methods, erection of machinery. Open to students who have had Mechanic Arts 1, 3, 4, 5 and 6. Two periods, both semesters. 2 units. Professor Henley.

*MECHANIC ARTS 9, 10. ADVANCED DESCRIPTIVE GEOMETRY—This course is a continuation of Mechanic Arts 1, 2. Church, *Descriptive Geometry*, is the text-

*Omitted 1906-7.

book used. The work covers shade, shadow and perspective. Open to all students who have taken Mechanic Arts 1, 2. 2 periods or an equivalent, both semesters. 4 units. Professor Holmes.

MECHANICAL ENGINEERING.

PROFESSOR E. M. BLAKE.

MECHANICAL ENGINEERING 1. HEAT ENGINES—Principles of thermodynamics as applied to steam and internal combustion engines, and compressed air machinery. Study of the general structural features and methods of operating the more important types of boilers, steam and gasoline engines. 2 hours and one weekly laboratory period, first semester. 3 units.

MECHANICAL ENGINEERING 2. DYNAMO-ELECTRIC MACHINERY—Theory underlying the generation, transmission and utilization of electric currents. Descriptions of the more important types of generators and motors. 2 hours and one weekly laboratory period, second semester. 3 units.

MECHANICAL ENGINEERING 3, 4. KINEMATICS OF MACHINERY AND ELEMENTARY MACHINE DESIGN. Theory and design of linkages, gears, cams, screws, etc. Two drafting room periods of two hours each per week, both semesters. 4 units.

MECHANICAL ENGINEERING 5. MACHINE DESIGN—Continuation of Mechanical Engineering 3, 4. Exercises in design particularly directed towards the designing of complete machines. Three drafting room

periods of three hours each per week, first semester. 4 units.

MECHANICAL ENGINEERING 6. MECHANICAL ENGINEERING—Study of power plants and other machinery installations as to arrangement of parts, adaptability to intended work, economy of first cost and operation. Exercise in design of power plants and writing of specifications. As a part of this course, trips will be made to machinery installations in mining districts of Arizona and Sonora, usually one or two weeks in March or April. One lecture and two drafting room periods of three hours each per week, second semester. 4 units.

MECHANICAL ENGINEERING 7, 8. MECHANICAL LABORATORY—Operation, inspection and testing of boilers, steam and gasoline engines, compressed air machinery, pumps and electric machinery. Three laboratory periods of three hours each per week throughout the year. 8 units.

METALLURGY.

PROFESSOR DE LASHMUTT.

METALLURGY 1. INTRODUCTION TO METALLURGY—Physical properties of metals, alloys, thermal treatment of metals, thermal measurements, fuel, refractory materials, metallurgical processes, furnaces, thermo-chemistry, metallurgy of iron and steel. Seniors in Mining Engineering and Metallurgy. Lectures and recitations, 4 hrs., for 1 month, first semester. 1 unit.

METALLURGY 2. FIRE ASSAYING—Fire assay for gold, silver and lead. Bullion assays. 15 hrs. per

week, or an equivalent, during March, April and May. Prerequisite, Chemistry 3 and 4. 2 units.

METALLURGY 3. METALLURGY OF GOLD AND SILVER—Stamp milling, chlorination, cyanidation, pan-amalgamation; Patio, Cazo, Fondon, Kröhnke and Tina processes, hyposulphite leaching practice, etc. Lectures and recitations. Prerequisites, Metallurgy 1 and 2. 4 hrs., first semester. To be given after completion of Metallurgy 1. 3 units.

METALLURGY 4. METALLURGY OF LEAD AND COPPER—Sampling, receiving, purchasing, roasting; blast furnace methods, reverberatory furnace methods; pyritic smelting, converting, desilveration of base bullion, electrolytic refining, hydro-metallurgy of copper, etc. Lectures and recitations. Prerequisites, Metallurgy 1, 2 and 3. 4 hrs., second semester. 4 units.

METALLURGY 5 and 6. METALLURGICAL LABORATORY—Concentration, amalgamation, cyanidation, chlorination, hyposulphite lixiviation, etc., tests together with mill work. 2 hrs., or an equivalent, both semesters. Primarily for seniors in the course in Metallurgy. 4 units.

METALLURGY 7. ORE DRESSING—Breaking, crushing, separating, concentrating, sampling; mill processes and management. Lectures and recitations. Prerequisites, Chemistry 3 and 4 and Metallurgy 2. 3 hrs., first semester. 3 units.

METALLURGY 8. Metallurgy of zinc, cadmium, nickle, mercury, bismuth, tin, antimony, cobalt, platinum, tungsten, molybdenum. Lectures and recitations. Prerequisites, Metallurgy 1, 2 and 3. 2 hrs., second semester. 2 units.

MILITARY SCIENCE AND TACTICS.

LIEUTENANT MC CLURE.

PRACTICAL COURSE—Infantry Drill Regulations, through the school of the battalion in close and extended order. Advance and rear guards, and outposts. Marches. The ceremonies of battalion review, inspection, parades, guard mounting and escort of colors. Infantry target practice. Instruction in first aid to the injured. Required of all able-bodied male students throughout the Freshman and Sophomore years, except that students who have satisfactorily completed four years of drill at the end of Freshman year may be excused from further work in the department. Elective during the remainder of the course. Juniors who elect this course may receive credit to the extent of two units. Three hours, both semesters.

THEORETICAL COURSE—The Infantry Drill Regulations covered by the practical instruction. The Manual of Guard Duty. Small-Arms Firing Regulations, Parts I, II and VII. The Articles of War. One lecture on camps and camp hygiene. Lectures on other military subjects. Required of all commissioned and non-commissioned officers. One hour, both semesters.

Students claiming exemption from drill will be required to secure a certificate of disability from a physician designated by the faculty, unless the disability is apparent. Those so excused will be required to elect a subject in place of this course. The officers will be appointed from an eligible list determined by examination, both scholarship and class standing being taken into account, according to the principles governing such selection at the United States Military Academy.

Each member of the military organization will be required to provide himself with the regulation uniform upon his entrance. A deposit covering the cost of the uniform should be made upon registration. The uniform consists of cap, coat and trousers of cadet gray cloth trimmed with black braid, and closely resembles the undress uniform of the United States Military Academy at West Point.

MINERALOGY.

PROFESSOR GUILD.

The main object of the course in mineralogy is to familiarize the student with facts and methods that will enable him to determine the character of an ore or mineral by an observation of its physical properties and by the performance of a few simple tests with the blow-pipe. The value of such a course cannot be over-estimated, since these quick methods of analysis are frequently needed in the field and mine when recourse cannot be had to a well-equipped chemical laboratory. The course is of value also to the student of general science, since it adds to the pleasure of a day in the mountains or field, and is necessary to full appreciation of the study of geology. The course is not only practical, but the theoretical side of the subject receives attention in mineral optics, crystallography and similar topics.

MINERALOGY 1, 2. Lectures and recitations in crystallography and the classification and uses of minerals; laboratory work in blow-pipe analysis and determinative mineralogy; the study of a type collection of 600 minerals arranged and classified according to Dana.

Text-books: Dana, *Text-book of Mineralogy*, and Brush, *Manual of Determinative Mineralogy and Blow-Pipe Analysis*. Open to students who have taken Chemistry 2 and Physics 2. Units are distributed as follows: Crystallography, 2; blow-pipe analysis, 2; descriptive mineralogy, 3.

MINERALOGY 3. Advanced crystallography and microscopic study of the rock-forming minerals. Open to students who have taken Geology 2 and Mineralogy 2. 2 hrs., or an equivalent, first semester. 2 units.

MINERALOGY 4. PETROGRAPHY—The preparation of thin sections of rocks for microscopic study, rock analysis, and the study of a type selection of rocks. Text-book: Harker, *Petrology for Students*. Open to students who have taken Mineralogy 3. 2 hrs., or an equivalent, second semester. 2 units.

MINING ENGINEERING.

PROFESSOR TOLMAN.

In this course attention is largely directed to the economics of mining, and the laboratory work is so arranged that upon the completion of the course the student will have in his notes plans which will be of value in the practice of the profession.

MINING ENGINEERING 1, 2. Ores, their nature and occurrence; location of claims; mining laws of the important mining countries of the world; prospecting; excavations; tunnels, shafts and methods of timbering; underhand, overhand, square sett, filling and caving methods of mining; pumping; ventilation; transportation; hoisting; installation of machinery and surface improvements.

Methods for undeveloped properties compared with those for developed mines. Mine accounts, cost sheets, stope sheets, assay plans; methods of management, mine sampling and mine reporting. Prerequisites, Mathematics 5, 6, Geology 1, 2. 2 hours and two laboratory periods of 3 hours each, both semesters. 8 units.

MINING ENGINEERING 3. PRACTICAL MINING— Before entering upon the work of the Senior year, all students who are candidates for the degree of B. S. in Mining must have spent at least four weeks in practical underground mining. The fulfillment of this requirement must be evidenced by the certificate of the mine superintendent or foreman, and by notes and sketches of the processes observed, to be presented to the faculty of the School of Mines, and discussed with them.

MINING EXCURSIONS. MINING ENGINEERING 4— In connection with the courses in Mining Engineering, Metallurgy and Mineralogy, trips will be made to mining districts of Arizona and Sonora, usually one or two weeks in March or April. These trips are required of all candidates for the degree of B. S. in Mining Engineering.

The purpose of these trips is to afford the mining students an opportunity for close study and inspection of mining and metallurgical plants, and of rock formations and of minerals of commercial value. The students are accompanied by two professors, and every effort is made to make the trips of the greatest practical value. The visits are carefully scheduled and notes, with sketches, measurements and photographs are taken, and elaborated into comprehensive report by each student after the return. These trips are of incalculable assistance to the lecture, text-book and draughting room work.

The subjects of special consideration are transportation, both above and below the surface, mine surveying, methods of stoping and timbering, the best treatment for each ore, assaying and furnace charges, smelting practices, concentration of low grade ores, power generation, pumping and water supply, and mill construction.

During 1905-6 the mining districts of Tombstone, Bisbee, Nacozari and Cananea, and the metallurgical plants at Douglas were visited in this way. The thanks of the University are due the superintendents of the various plants visited, for their efforts and care in acquainting the students with the works under their management.

MUSIC.

MR. HOOVER.

The department of music was established in September, 1906, with the primary object of furnishing instruction in vocal music, especially in the form of choruses and glee clubs. The work during the year 1906-1907 has consisted of a general chorus open to all students and required of all unexcused preparatory students, meeting twice a week; two glee clubs meeting twice a week (one for men and one for women); and an orchestra meeting twice a week. No college credit has been allowed for this work.

Mr. Hoover will also give private instruction in both vocal and instrumental work, at the rate of \$20 for a term of ten weeks, two lessons per week. No University credit will be allowed for this work, nor is the University prepared to furnish full opportunities for regular use of pianos for practice. The pianos in the dormi-

tories may be used to a limited extent. provided the practice does not disturb ordinary study.

During the year 1907-1908, the following courses will be offered, with credit value as announced :

MUSIC 1, 2. ELEMENTARY CHORUS WORK, consisting of sight reading, elementary theory, training of the ear, and simple chorus work. Open to all students. Two half-hours throughout the year. 1 unit.

MUSIC 3, 4. ADVANCED CHORUS WORK, consisting of theory, harmony, and the heavier choral works. The class will be expected to form a part of the Annual Festival Chorus with the Tucson Choral Club. Open to all students sufficiently advanced to undertake the work. 2 hrs., both semesters. 2 units.

MUSIC 5, 6. GLEE CLUBS AND ORCHESTRA. Separate glee clubs will be formed for young men and young women. All three organizations will hold two rehearsals each per week. Open to all students who show the required proficiency as vocalists or with instruments. 2 hrs., both semester. 1 unit.

PHILOSOPHY.

MRS. STANLEY.

*PHILOSOPHY 1. HISTORY OF PHILOSOPHY—A study of the basal concepts and fundamental problems of philosophical thought as developed historically. Lectures, recitation and assigned reading. Text-book, Schwegler, *History of Philosophy*. 2 hrs., both semesters. 4 units.

*PHILOSOPHY 2. EVOLUTION—A study of the term in its widest extension, as the law of the cosmic process; its significance in the various departments of science and

*Omitted 1906-7.

its bearing on philosophical and ethical thought. Reading in Fiske, *Cosmic Philosophy*; Le Conte, *Evolution and its Relation to Religious Thought*; Wallace, *Darwinianism*; Spencer, *Principles of Sociology*; Bagehot, *Physics and Politics*, and Howison, *Limits of Evolution*. Lectures and discussions. 2 hrs., both semesters. 4 units.

*PHILOSOPHY 3. PSYCHOLOGY—A special consideration of the subject as applied to teaching. Lectures, recitations and collateral reading. Open to Juniors and Seniors. 4 hrs., first semester. 4 units.

PHILOSOPHY 4. PEDAGOGY—An account of educational evolution, both as a culture fact in the history of civilization and as a foundation for professional work; lectures, giving a brief but comprehensive outline of school systems, a special study of leading educators such as Comenius, Pestalozzi, Froebel, Mann and others; methods of teaching, school management and school law. Arrangements have been made with the Tucson city schools to use the Holliday school as a practice school for this class. Open to students who have taken Philosophy 1. 2 hrs., both semesters. 4 units.

PHILOSOPHY 5. LOGIC—Text-book, Jevons, *Logic*; reading from Mill, Hamilton, Thompson and others. Open to Juniors and Seniors. 4 hrs., first semester. 4 units.

PHILOSOPHY 6. ETHICS—Theoretical and practical ethics; view of the historical development of the science; origin and development of the moral consciousness; application of the principles of ethics to the problems of life. Lectures, discussions and assigned reading. Open to Juniors and Seniors. 3 hrs., second semester. 3 units.

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PHYSICAL CULTURE.

ASSISTANT PROFESSOR LIGDA.

This department is organized to supply the opportunity for such physical work as experience has shown to be necessary under modern conditions, to counteract the deleterious effects of close application to mental work and to favor the attainment by the student body of a high state of physical efficiency.

It is intended that a thorough physical examination, including an examination of the eyes, heart and lungs, shall preface the work of every student in physical culture. This examination will be made as soon as possible after the student enters the University and at intervals during his or her course for safety and for determining the results of the work. Anthropometric cards and charts are platted for the students when desired. In special cases the University reserves the right to require a complete physical examination by a designated physician at the expense of the student.

In addition to the regular class drill a certain part of which consists of training and contests in athletic sports, the University is represented by teams in foot ball, base ball, track and field, tennis, and basket ball. Every facility is provided for track and field athletics. The field on the campus contains gridiron, base ball diamond, tennis and basket ball courts, sprinting paths, jumping and vaulting pits.

The course for women consists of systematic exercise for the harmonious development of the entire body, besides a course for the development of grace of movement and the production of symmetry of physique.

Special corrective machinery is supplied for this department, so that even the weakest students may be given proper and healthful exercise. Those pursuing this course are required to provide themselves with a gymnasium suit, consisting of a blouse waist and divided skirt with the regulation gymnasium shoes. The suit requires four yards of double width, 54-in. dark blue serge. The waist has a sailor collar trimmed with white braid. The Butterick pattern may be used or ready-made suits may be had at the gymnasium for \$3.75.

The plan of work for the men is three-fold: general graded class work, corrective work and elective athletic work. The athletic work is taken in combination with the class work in order that the student by this combination may obtain the best possible development. The corrective work is given under special supervision to all those who are in need of special development, and, also, to those who are unable to do the regular class work.

PHYSICS.

PROFESSOR DOUGLASS.

The object of this course is to acquaint the student with the fundamental physical principles which underlie the higher courses of chemistry, mechanics and engineering. Special attention is therefore given to the study of force and energy, the physics of liquids and gases and heat. Owing to the great modern development of electricity, an important part of the course is devoted to this study. Note books are required in all courses.

PHYSICS 1, 2. GENERAL PHYSICS—Lectures, recitations and laboratory work. First semester: Mechan-

ics and Heat with corresponding experiments in the laboratory. Second semester: Electricity, Wave Motion, Sound and Light. The laboratory experiments give prominence to general electrical measurement, but include the study of wave motions and their application to the other subjects. Open to students who have taken a course in elementary physics and Mathematics 1. 2 hrs. and 2 two-hour periods in the laboratory, or an equivalent, both semesters. 8 units.

PHYSICS 3. THERMODYNAMICS AND HEAT—A study of the foundation principles underlying mechanical engineering, latent and specific heats, conductivity, expansion, mechanical equivalent, high temperatures, cycles, entropy, properties of steam, etc. Prescribed for third year in mechanical engineering course. Two 2-hour laboratory periods and one hour for lecture or recitation, or an equivalent, first semester. 3 units.

PHYSICS 4. ELECTRICAL AND OPTICAL MEASUREMENTS—A study of the electrical machines and instruments used in mechanical engineering, and of the optical instruments handled in mining and civil engineering courses. Prescribed for the third year in mechanical and civil engineering courses. Two 3-hour periods, second semester. 4 units.

SOCIOLOGY.

MR. ———

*SOCIOLOGY 1. ELEMENTS OF SOCIOLOGY—A study of the nature, origin and development of the social forces; a treatment of the phenomena and laws of society as it is, including whatever conduces to or modifies human association. Dealey and Ward, *Text-book of Sociology*,

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will be used as a guide and supplemented by lectures, collateral reading and reports. Open to Juniors and Seniors. 3 hrs., first semester. 3 units.

*SOCIOLOGY 2. CHARITIES AND CRIME—A consideration of social pathology. including an examination of the origin and nature of the dependent, defective and delinquent classes. A study will be made of the principles and methods of relief; cause of crime; prison systems; juvenile offenders; preventative measures, etc. Guide, Warner, *American Charities*. Prerequisite, Sociology 1. 3 hrs., second semesters. 3 units.

SPANISH.

PROFESSOR TURRELL, MRS. HOCHDERFER.

SPANISH 1, 2. First semester: Hills and Ford, *Spanish Grammar*; Turrell, *Elementary Spanish Reader*, begun. Conversation and oral work. Second semester: Grammar and Reader completed; additional readings with composition work and dictation. 5 hrs., both semesters. 8 units. Mrs. Hochderfer.

SPANISH 3, 4. First semester: Reading of Alarcon, *El Capitan Veneno*; Galdó, *Marianela*. Second semester: Valdes, *La Alegria del Capitan Ribot*; Galdó, *Dona Perfecto*. Two hours each week throughout the year will be given to composition, letter-writing and syntax, using Ramsey, *Lo Esencial del Lenguaje Castellano*. 5 hrs., both semesters. 8 units. Professor Turrell.

SPANISH 5. Lectures in Spanish on the history of Spanish literature. The classical Spanish drama. Study of the age of Lope de Vega and Calderón. Reading of Lope, *La Estrella de Sevilla*; Calderón, *La Vida es*

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Sueno. 3 hrs., first semester. 3 units. Professor Turrell.

SPANISH 6. Recent Spanish literature, with particular study of the modern drama. Teading of Eche-garay, *O Locura o Santidad*, and *El Gran Galeoto*; Larra, *Partir a Tiempo*; Nuñez de Arce, *El Haz de Lena*, Galdó, *Electra*, etc. 3 hrs., second semester. 3 units Professor Turrell.

BUREAU OF MINES AND ASSAYING.

A separate department of the School of Mines under the name of "The Bureau of Mines and Assaying" has been established to receive and work ores, and to make assays and analysis of ores, minerals, mineral waters and petroleum.

In accordance with the act of the Legislature of the Territory, approved March, 1897, and amended in March, 1899, assays of ores and minerals are made for the prospectors and miners of Arizona and for others at fixed rates established by the law, and tabulated below. To meet the requirements of this work a special laboratory building of brick has been erected and maintained. It is fitted up as a complete assay office and is provided with a large double brick coke-furnace, a melting furnace and gasoline furnaces in a fire-proof room. There are in addition, a parting and wet assay room. a balance room and offices.

Extreme accuracy and excellence of work are considered of more importance than pecuniary profits. All assays are made in duplicate and if not accordant are repeated. A special expert assayer is employed, and the assays are not made by students, who receive their instruction in the regular laboratories of the University.

The money received for assaying is deposited monthly to the credit of the assay fund, which is used to pay the assayer and the cost of materials and apparatus.

Rates for Assaying and Chemical Determination.

COMMON ASSAYS AND CHEMICAL DETERMINATIONS.

One element only :

Gold, or silver, or copper, or lead, or iron, or insoluble,	\$ 1 00
Zinc, or calcium, or magnesium, or sul- phur or manganese	1 50
Silican or chlorine	2 00

Combinations :

Gold and silver,	1 00
Copper and iron, or lead or iron	1 50
Insoluble, copper, and lead	2 00
Insoluble, copper, and iron	2 00
Insoluble, lead, and iron	2 00
Insoluble, zinc, and iron	2 50
Insoluble, lead, copper, and iron	2 50
Gold, silver, copper. and lead	2 50
Gold, silver, copper, iron, and insoluble	2 50

SPECIAL CHEMICAL DETERMINATIONS.

One element only :

Aluminum, or tungsten, or barium, or chromium	3 00
Cadmium, or tin, or arsenic, or bismuth or antimony, or titanium, or sodium, or potassium, or uranium, or phosphorus	4 00
Nickel, or cobalt, or molybdenum, or van- adium	5 00

CHEMICAL ANALYSES.

Coal and coke analysis, giving moisture, volatile combustible matter, fixed car- bon and ash	5 00
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BUREAU OF MINES AND ASSAYING 85

The same, including determination of sulphur and phosphorus	7 50
Silicate analysis	15 00
Cement analysis (chemical)	15 00
Cement analysis (mechanical)	2 50
Cement tests (strength and soundness, by the Department of Civil Engineering)	3 00
Boiler water analysis	10 00

Rates for Testing of Ores.

Stamp Mill Amalgamation, including sampling, assays, retorting, etc. :

For lots of one ton or thereabouts \$30 00

The same, with concentration of pulp on Wilfley table 30 00

For lots of two tons, without concentration 40 00

For lots of two tons, with concentration 45 00

Smaller Amalgamation Tests, including all sampling charges, and concentrating after amalgamation :

For small samples up to five pounds \$ 7 00

For small samples, five to twenty-five pounds 10 00

For small samples, twenty to one hundred pounds 15 00

In these smaller tests, the sample is ground to pass a suitable mesh, and is agitated with mercury. The mercury is panned out, retorted, and the values determined in bullion. The values in the concentrates and tailings are also determined. The number of tests necessary to determine the adaptability of any ore to treatment by cyaniding varies so greatly that no general rates can be offered.

Consignments, Remittances, Etc.

Samples, ores, and other consignments should be shipped to the University of Arizona, the School of Mines, Tucson, Arizona. Small quantities may best be sent by mail, at the rate of one cent per ounce; larger quantities by express or by freight. The Wells-Fargo Express Company makes daily deliveries at the University.

All assays, chemical determinations and chemical analyses, except gratuitous qualitative tests mentioned elsewhere, must be paid for in advance.

No determination of any kind will be made until the required payment arrives. Remittances should be made by post-office money order, Wells-Fargo money order, bank draft, or check on a Tucson bank, payable to K. C. Babcock, President, University of Arizona, to whom also business communications relating to matters discussed in this circular should be addressed.

THE AGRICULTURAL EXPERIMENT STATION STAFF.

KENDRIC CHARLES BABCOCK, Ph. D.

President of the University

ROBERT H. FORBES, M. S. - - - Director and Chemist

JOHN JAMES THORNBUR, A. M. - - - - - Botanist

*VINTON A. CLARK, B. S. - - - Agriculturist and
Horticulturist.

ALBERT EARLE VINSON, Ph. D. - Associate Chemist

FREDERICK W. WILSON, B. S. - Animal Husbandman

GEORGE E. P. SMITH, C. E. - - Irrigation Engineer

WILLIAM B. MCCALLUM, Ph. D. - Assistant Botanist

EDWARD E. FREE, B. S. - - - - Assistant Chemist

T. D. A. COCKRELL, - - - Consulting Entomologist

JAMES C. CASSELMAN, - - - - - Clerk

ORGANIZATION AND WORK.

The Agricultural Experiment Station is a legally constituted department of the University, whose purpose is to "aid in acquiring and diffusing * * * useful and practical information on subjects connected with agriculture, and to promote scientific investigation and experiment respecting the principles and applications of agricultural science."

With the above objects in view, the organization of the station includes the departments of administration,

*Resigned May 1, 1907.

agriculture and horticulture, animal husbandry, botany, and chemistry, the whole or a major portion of the time of one or more members of the station staff being being devoted to each department of the station work. Provision is made for meteorological work also, though to a less degree.

Owing to the wide variation in agricultural conditions in Arizona, it has been found of advantage to distribute the work so that each department is located, so far as possible, in that region most favorable to the accomplishment of its own special results. According to this principle, the various lines of Experiment Station work have been distributed as follows :

The Director's office and the departments of Botany and Chemistry are maintained at Tucson in the University buildings. Through this arrangement the Experiment Station profits by the buildings and libraries of the University, while the University is benefitted from time to time by the teaching ability of members of the Station staff. It has been found that from this base of operations the three great agricultural districts of the Territory—Salt River valley, the lower Colorado and the upper Gila—are accessible with equal convenience for field work and observations.

On the same ground—fitness of location for the work undertaken—the Experiment Station farm has been maintained and strengthened at Phoenix. Salt River Valley is intermediate in elevation, in situation, and in mean yearly temperature between the other two important farming districts above mentioned, and for this reason the agricultural and horticultural results obtained there

are capable of the most general application in the Territory at large.

On the same principle again, the date palm orchard, conducted in co-operation with the United States Department of Agriculture, is located in the alkaline district south of Tempe, where a successful demonstration of this palm as a commercial fruit producer will be of the greatest value, creating use for great areas of alkaline land in the arid southwest. Another orchard has just been planted on a tract near Yuma.

The range station also, for the study of worn-out range country with a view to its reclamation to usefulness, is located in a typical district near Tucson, and is conducted under the auspices of the department of botany, co-operating with the United States Department of Agriculture.

The services of specialists in various subjects, such as entomology, meteorology, and soil survey work, have also been secured from time to time.

The results of the Experiment Station work are made public at frequent intervals in the bulletins and reports of the Station. These publications are made in two series: First, the longer and more technical bulletins, stating in considerable detail the investigations as they mature; and, secondly, the "Timely Hints for Farmers," which are brief writings issued at the time when they will be most useful, written in plain language, and presented in popular form. The annual reports, also, are for the most part written popularly, and afford a convenient and reliable summary of each year's work as it comes to completion.

The Experiment Station work conducted and published on the lines indicated above has a two-fold value. In the first place the suggestions made or derived from the investigations of the Station are of direct material profit to the agricultural public and are intended to be immediately applied to advantage in the betterment of agricultural practice. In the second place, these writings are intended to serve an educational purpose, inasmuch as they are so presented as to constitute lesson sheets for the benefit of the careful reader. It may, therefore, be considered that the Experiment Station reaches a class of some thirty-five hundred readers in the Southwest at frequent intervals by means of its "Timely Hints" and other publications. The operations of the range study tract at Tucson, the Experiment Station farm at Phoenix, and the date palm orchards at Tempe and Yuma serve also as an object lesson to the adjacent public.

It is believed that this distributed and mobile organization is especially effective, not only for the purposes of the Experiment Station, but also for those of the University as well, since it allows the station to conduct its work in localities suitable for the accomplishment of results; and, again, it causes the public to become better acquainted with the Territorial University, of which the Station is a department.

An appropriation of eleven thousand dollars, made for the use of the Station by the Twenty-second Legislature, very satisfactorily attests the estimation in which the work of the Station is held. The appropriation is intended for the improvement of the date orchard; for

purchasing live stock and buildings for the farm ; for issuing publications, and for holding farmers' institutes and short courses of instruction throughout the Territory.

Provision, therefore, is made for the symmetrical development of this work in the Territory, both experimentally and educationally ; and, prospectively, "the farmers' college" bids fair to increase in usefulness to the growing agricultural interests of the Territory.

PREPARATORY DEPARTMENT.

KENDRIC CHARLES BABCOCK, Ph. D., President, Civics.
SIDNEY CARLETON NEWSOM, A. M., Acting Principal.

INSTRUCTORS.

CHARLES ALFRED TURRELL, A. M., French, German,
Spanish.
WILLIAM WHEELER HENLEY, A. B., Shopwork and
Drawing.
LIEUT. SAMUEL V. MCCLURE, Military Science and
Tactics.
WILLIAM GEORGE MEDCRAFT, A. M., Mathematics.
ANDREW ELLICOTT DOUGLAS, A. B., Science.
A. MAY ASHWORTH, A. B., English.
LEVONA PAYNE NEWSON, Ph. D., Latin.
VICTOR LIGDA, B. S., Physical Training and French.
ESELLE G. LUTRELL, A. B., English.
RAYMOND C. BENNER, M. S., Chemistry.
FREDERICK E. TALMAGE, B. L., Bookkeeping, Stenog-
raphy, Typewriting.
OPAL I. TILLMAN, B. S., Domestic Science.
IDA C. REID, B. Ph., Mathematics and History.
MRS. M. HOCHDERFFER, A. B., Spanish.

GENERAL INFORMATION.

In this department the University offers the work of
a well-organized, four-years high school, with the added

advantages of shopwork and drawing and of domestic science. The general library and gymnasium are open to all students in this department.

The equipment of the scientific laboratories is available for use in this preparatory work, whenever it can be used advantageously, and makes possible strong work in elementary science. The instructors in this department are assisted by the professors of the college departments, several of whom regularly conduct preparatory classes. By reference to the course of study which follows, it will be seen that it offers a comprehensive training for those who may not be able to pursue their studies farther, while it gives a good preparation for college.

ADMISSION.

Admission to regular standing in the first year of the preparatory course presupposes the completion of the work of the eighth grade of the public or parochial schools. Students who do not bring certificates showing the completion of this work, must take examination to test their ability to pursue profitably the work of the first year.

The Board of Regents on April 10th, 1906, voted that after September 1, 1906, no pupils who have not completed the work of the ninth grade (or the first year of a high school) will be admitted into the University from cities in Arizona having more than 5,000 population.

All students entering the preparatory department will be required to take an examination in oral reading. To remedy notable deficiency in this subject, the University will require extra work in addition to other studies.

In all cases in which the preparation of a student in a particular subject proves to be deficient, the University reserves the right to require the student to secure at his own expense the help of an approved coach until the deficiency is remedied.

COURSE OF STUDY.

The following course of study will be required of all students who fit themselves at the University for entrance to the Freshman class in 1907. Such variations from it will be made during the next year as will adapt it to the case of students already in the sub-collegiate department who took part of their work under the former requirements.

Military drill is required of all able-bodied male students throughout the course. Physical training is required of all students, unless they are excused by the President upon presenting a certificate from one of the University physicians. The young men have drill three times per week and exercise in the Gymnasium twice. The young women have physical culture three times a week.

The language begun in the second or third year must be pursued for at least two years in order to secure credit towards graduation.

Though the subjects are for convenience grouped by years in the following schedule, the departmental method is followed. In the description of courses, the subjects are arranged by groups or departments in the consecutive order in which they are taken up and students will be required to take them in this order. Aside from this sequence the ability of each student must determine what

subjects will be pursued at any given time, due regard to be given to the proper balance of subjects. The wishes of parents will always be given careful consideration in making up the schedule of work for each student, but the final decision in the matter must rest with the committee on registration, which is composed of persons who have had long experience in secondary and collegiate teaching. Individual attention will be given to the needs of each student.

To each student who completes the studies of this course receiving a total of sixteen units (a unit representing a subject pursued for one year with five, or four, recitation periods per week), a certificate stating that fact will be given.

This certificate will entitle the holder to admittance to the corresponding University courses of instruction without examination.

FIRST YEAR.

(The figures represent recitations per week.)

English	5	Physical Geography	3
Algebra	5	Drawing and shop work,	
Greek and Roman History	3	or Domestic Science	5

SECOND YEAR.

English	5	*French (first year)	5
Algebra	5	*Spanish (first year)	5
European History	5	*Drawing and shop work,	
*Latin (first year)	5	or Domestic Science	5
*German (first year)	5	*Bookkeeping (7 hours)	5

*Subjects thus marked are elective. One elective must be chosen in the second year. In the third year and in the fourth year, electives making up at least nine hours must be chosen.

THIRD YEAR.

English	5	*French (second year)	5
Plane Geometry	5	*German (first year)	5
*Chemistry	5	*German (second year)	5
*Latin (second year)	5	*Spanish (first year)	5
*Greek (first year)	5	*Spanish (second year)	5
*French (first year)	5	*Stenography	5

FOURTH YEAR.

English	5	*Greek (second year)	5
American History and		*French “ “	5
Civics	5	*German “ “	5
*Solid Geometry (first half)	4	*Spanish “ “	5
*Trigonometry (s'c'd half)	5	*Parliamentary Practice	1
*Physics	5		
*Latin (third year)	4		

ENGLISH.

The English of the preparatory course is based upon what is known as the entrance requirements of New England colleges. The work is in general divided into three parts: Classics, studied in class, composition and grammar work done partly in class and partly outside, and supplementary reading done largely outside the class room. All these parts of the work may be carried on at the same time, as the circumstances of the class seem to require, the classics and supplementary reading forming the basis of a large part of the work in grammar and composition. Throughout the course, however, a primary aim is to develop the student's individual power of

*Subjects thus marked are elective. One elective must be chosen in the second year. In the third year and in the fourth year, electives making up at least nine hours must be chosen.

expressing himself in words. The time allotted to these three phases of English varies from year to year, increasing attention being paid to the appreciative and critical faculty as the course advances. In the fourth year a brief outline history of English and American literature occupies about one-third of the year's work in English.

Five hours each week throughout the course are given to English. According to the following general outline selections from the list below are made at the discretion of the teacher, preference being given to the New England College Entrance Requirements, which are marked by an asterisk*.

FIRST YEAR.

ENGLISH GRAMMAR AND COMPOSITION receive one-half of the time of the first year.

CLASSICS. Longfellow's *Tales of a Wayside Inn*, Bryant's *Water Fowl*, *Planting of the Apple Tree*, *Forest Home*, the *Antiquity of Freedom*, Lowell's shorter poems, Tennyson's *Enoch Arden*, Miller's *Daughter*.

SUPPLEMENTARY READING. *Talisman*, *Tom Brown at Rugby*, *Last of the Mohicans*, *The Sketch Book*, *The Man Without a Country*, *The House of Seven Gables*, **Ivanhoe*.

SECOND YEAR.

COMPOSITION AND GRAMMAR. As in first year with attention to figures of speech, reproducing the work of classic authors, elementary etymology, exercises in exposition, narration and description.

CLASSICS. **The Vision of Sir Launfal*, **The Ancient Mariner*. The *Ballad Book* (Bates), *Sohrab and Rustum* and **The Idylls of the King*, studied as in first year.

SUPPLEMENTARY READING. Deserted Village, Lorna Doone, Tale of Two Cities, Life of Goldsmith, Quentin Durward, The Cricket on the Hearth.

THIRD YEAR.

Composition and Rhetoric are continued with emphasis on elementary argumentation and exposition.

CLASSICS. Julius Caesar, *The Merchant of Venice, The Princess, *Sir Roger de Coverly, Poems of Burns, Carlyle's Essay on Burns. These are for general reading as in the first and second years. For careful reading are the following: *Milton's *L'Allegro*, *Il Penseroso*, *Comus*, *Lycidas*; *Macaulay's Essay on Milton. Special attention will be given to the author, his times and surroundings, and his style.

SUPPLEMENTARY READING. Sesame and Lilies, Backlog Studies, Treasure Island, Kidnapped, Silas Marner, Alhambra.

FOURTH YEAR.

COMPOSITION AND GRAMMAR. Exercises in narration and description for flexibility and ease of expression and general preparation for entrance requirement "b" on page 41 of this register.

CLASSICS. *Burke's Speech on Conciliation, Macaulay's *Life of Johnson, Essay on Addison, *Macbeth, The Tempest, Midsummer Night's Dream. These are all for thorough study.

HISTORY OF ENGLISH LITERATURE. From the earliest times, with text-book as guide, with a review in chronological order of the classics studied during the

*Subjects thus marked are elective. One elective must be chosen in the second year. In the third year and in the fourth year, electives making up at least nine hours must be chosen.

four years of the course, to prepare for examination in entrance requirement "a" on page 40 of this register. Special attention is paid to Keats, Shelley, Tennyson and other representative poets of the nineteenth century.

SUPPLEMENTARY READING. *Vicar of Wakefield, The Making of an American, The Newcomes, Oliver Twist, American Orations and Addresses.

MATHEMATICS,

FIRST YEAR.

ALGEBRA. Introduction, factoring, fractions, simple equations, simultaneous equations, and special problems.

SECOND YEAR.

ALGEBRA. Involution, evolution, theory of exponents, radicals, quadratic equations, and proportion.

After 1907 but two years will be devoted to preparatory algebra. The two years' work will be required for entrance.

THIRD YEAR.

Plane geometry, including thorough work in original exercises.

FOURTH YEAR.

First semester, solid geometry with original exercises. Second semester, plane and spherical trigonometry.

MECHANIC ARTS.

This work consists of both drawing and shop work, between which subjects the student's time is about equally divided. The course covers two years and is designed to furnish a thorough elementary knowledge of manual training as taught in the secondary schools of the country.

FIRST YEAR. Drawing—Freehand sketching in perspective and orthographic projection. Reinhart's lettering, free-hand working drawings.

Shop work—"Sloyd," care and use of woodworking tools.

SECOND YEAR. Drawing—Mechanical drawing and geometrical problems.

Shop work—Forging, joinery, wood-turning.

SCIENCE.

It is the object of the courses in science to initiate the student into the processes and methods used in laboratory work; to teach close observation, careful manipulation and logical deduction; to acquaint the student with the fundamental facts of the various branches of science and to give full practice in the use of good English in describing various observations and experiments. To insure better results in the notebooks, they will all be passed upon by one of the instructors in English.

PHYSICAL GEOGRAPHY—This course, combining the laboratory method with the text-book, aims to give the pupils training in exact observation of familiar phenomena, like distance, weight, pressure of liquids and gases, temperature, winds, clouds and the habits of plants and animals. The natural forces producing erosion, formation of soils and rocks, the processes of nature as seen in seed germination and plant growth (with demonstrations with the microscope) will be discussed, with frequent experiments and field excursions. The entire country within reach of the University is a great natural laboratory, full of interest and information for all. The course

explains these features which become so familiar to everyone residing here.

CHEMISTRY. A year's work with the text and in the laboratory, in such proportions as the instructor decides upon. Each student must keep a note-book in which he describes the process and results of his laboratory work.

PHYSICS. The course aims to show that physics is not something abstract or mysterious, but is the simple explanation of everyday occurrences not usually understood and often unnoticed. It consists of three recitation periods and four laboratory periods per week, carried on along the lines laid down for the senior year in secondary schools. Each student must keep a note-book in which a minimum number of experiments must be written up.

DOMESTIC SCIENCE.

The course in domestic science for young women is arranged to give instruction in the science and art of home economics, and to raise home making to a higher plane.

SEWING. The making of laboratory uniforms, plain undergarments and dresses, with talks on materials and implements used; use of machine with simple attachments. Three periods per week through the year.

COOKING. Practical work in the preparation of food, with study of the food principles and the effect of heat upon each proper combination in a well-balanced diet. Two periods per week through the year.

HISTORY.

The aim of the work in history is to lead the pupil to see the development of races and nations along politi-

cal, social and religious lines, and to arouse in him a love for the subject and a habit of broad and discriminating reading.

The work of the first year consists of a survey of the development and characteristics of the Greek and Roman civilizations. A text such as Wolfson, *Essentials of Ancient History*, or West, *Ancient History*, will be supplemented by collateral reading and a note-book.

The work of the second year includes mediaeval and modern history. The aim is to give the students an idea of the essential unity of history and the leading facts in the political development of races and nations. Harding, *Essentials of Mediaeval and Modern History*, is used, supplemented by the reading of references contained therein.

Hart, *Actual Government*, is the text-book in civics. The historical development of the subject is made prominent while practical problems, such as taxation and municipal government, are made the subjects of special investigation and study. Beginning with September, 1907, the work in civics will be combined with the history of the United States, making a full subject, five times a week. The text in history will be Channing, *Student's History of the United States*.

LATIN, GREEK, FRENCH, GERMAN AND SPANISH.

For an outline of the courses in Latin and Greek see page 40, under requirements for admission.

For an outline of the courses in French, Spanish and German see pages 61, 81, 63.

BOOKKEEPING AND COMMERCIAL PRACTICE.

Bookkeeping is taught by the modern budget system. The work is individual and each student may

progress as fast as his time and ability permit. The course is thorough in all the details of office practice. Students are made familiar with different filing cabinets, the filing of letters, the use of card ledgers, the copying and indexing of letters and bills in copy books. The course includes instruction in commercial law, with special emphasis laid on the ordinary forms of commercial paper and the different endorsements. The department is equipped with the latest vertical files, cabinets, letter press and office sundries. All students in bookkeeping are required to take some other branch of mathematics and must show proficiency in English.

STENOGRAPHY AND TYPEWRITING.

A complete course in stenography is offered. The Gallagher-Marsh system, a system which has received the highest endorsement of leading court reporters on the Pacific coast, and which has been adopted by the Boards of Education in the largest cities of California, has recently been adopted. The amount of time allotted for this work has also been increased from five hours to eight hours per week. The object of the course is to train students so that they may become practical stenographers. With this end in view particular stress is laid upon neatness, filing, copying and indexing. This branch of the commercial department is equipped with up-to-date filing cases, office sundries, and six typewriters, four of which are Remingtons, one an Oliver and one the L. G. Smith Visible. Five of the typewriters are new. Students taking this work are required to have had one year in English, and to take English with this course.

ALUMNI ASSOCIATION.

The Alumni Association of the University of Arizona was organized on the second day of June, 1897.

The object as expressed in its constitution is: "To promote the interests of the University, to secure unity among its graduates and to foster an attachment to our Alma Mater."

Concerning the last two clauses of this declaration it may be said that the organization is carrying out its meaning in a manner which leaves little, if anything, to be desired. There is no doubt regarding the loyalty of the graduates to the University of Arizona and no question of their unanimous desire for the prosperity of the institution.

The first clause of the above declaration, however, deals with a matter which in a sense admits of more growth than those just mentioned, and the members of the association realize that there is room for further progress in the accomplishment of this purpose.

It will be the aim of the alumni association to create a deeper feeling of interest and pride in the University of Arizona among the people of the Territory.

1895.

*Charles Oma Rouse, B. S.

Mercedes Anna Shibell, B. S., [Mrs. A. J. Gould],
Tucson, Arizona.

Mary Flint Walker, B. S., [Mrs. Pearl Adams],
Benson, Arizona.

*Died, 1906.

1897.

Edward Marshall Boggs, C. E., [nunc pro tunc],
Chief Engineer Oakland Electric Railways, Oakland,
Cal.

Clara Cramond Fish, B. S., [Mrs. F. C. Roberts],
Phoenix, Arizona.

George Ojeda Hilzinger, B. S., Teller in Bank, El
Paso, Texas.

Mark Walker, B. S., Metallurgist, Tombstone,
Arizona.

1898.

Hattie Ferrin, B. S., [Mrs. Charles Solomon], Sol-
omonville, Arizona.

Granville Malcolm Gillett, B. S., Draughtsman in
Surveyor General's Office, Phoenix, Arizona.

Minnie Watts, B. S., [Mrs. W. B. Smith], Altaville,
California.

*John Desha Young, B. S.

1899.

Robert L. Morton, B. S., Assayer, Yuma, Arizona.

1900.

Ida Clarissa Flood, B. S., [Mrs. G. Dodge], Oak-
land, California.

Samuel Pressly McCrea, B. S., A. B., Principal of
High School, Redwood City, California.

Charles Pierce Richmond, B. S., Cyanide Manager,
La Union, Salvador, Central America.

Florence Russell Welles, B. S., [Mrs. Wm. Angus],
Los Angeles, California.

*Died April 8, 1899.

1901.

Rudolph Castaneda, B. S., Surveyor, Tucson, Arizona.

Clara Ferrin, B. S., Teacher, Tucson, Arizona.

George Millard Parker, B. S., Denver, Colorado.

David Hull Homes, B. S., [nunc pro tunc], Professor of Drawing, University of Arizona, Tucson, Arizona.

1902.

Andrew Gilbert Aiken, A. B., B. S., Surveyor, Canton, New York.

Moses Blumenkranz, B. S., Assistant Superintendent Shannon Copper Company, Metcalf, Arizona.

Ruth Brown, Ph. B., [Mrs. Wilkins Manning], Tucson, Arizona.

Felix Grundy Haynes, B. S., Casa Grande, Arizona.

Rose Belle Parrott, Ph. B., Teacher, Roseburg, Oregon.

Philip Matthew Reilly, B. S., Mining Superintendent, Campas, Sonora, Mexico.

Bertram L. Smith, B. S., Assayer, Silver Bell, Arizona.

Bessie Smith, Ph. B., [Mrs. Earle Davis], Tombstone, Arizona.

Walter James Wakefield, Assayer, Tucson, Arizona.

1903.

Advanced Degrees:

Hon. William Herring, LL. D., Tucson, Arizona.

John William Gorby, B. A., [Marietta], M. A., teacher, Chicago, Illinois.

Benjamin Franklin Stacey, [B. A., B. D., Lombard], M. A., Teacher, Pasadena, California.

Richard Lamar Drane, B. S., Chief Draughtsman, G. V., G. & N. Ry., Tucson, Arizona.

George Mark Evans, [LL. B., Michigan], Ph. B., Teacher, Santa Ana, California.

Leslie Alexander Gillett, B. S. [Mining], Draughtsman, Surveyor General's Office, Phoenix, Arizona.

Georgia Ann Holmesley, Ph. B., Teacher, Clifton, Arizona.

Edward Horton Jones, B. S., Assayer, Magdalena, Sonora, Mexico.

John Williard Prout, Jr., B. S., Superintendent Mowry Mine, Patagonia, Arizona.

Thomas Edward Steele, B. S., Assayer, La Cananea, Sonora, Mexico.

1904.

William Burnham Alexander, B. S., Civil Engineer, Tucson, Arizona.

Elbert John Hollingshead [Kimble], B. S., Los Angeles, California.

Frank Caleb Kelton, B. S., Civil Engineer, Tucson, Arizona.

Estella Markham Prout, Ph. B., Denver, Colorado.

John Williard Prout, Jr., B. S. [Mining]. See 1903.

1905.

Ora Elinor Norway, Ph. B., Patton, California.

1906.

Advanced degree:

William B. Begg, A. B. [Toronto], M. S.

Chester Bennett Clegg, B. S. [Civil Engineering], Draughtsman, Roosevelt, Arizona.

John Wesley Gebb, B. S. [Mining], Tucson, Arizona.

Roy Bartley Kilgore, B. S. [Mining], Seattle, Washington.

Roy Gibbons Mead, B. S. [Mining], Mining Superintendent, Ray, Arizona.

Roy Webb Moore, B. S. [Mining], Campus, Mexico.

Carobel Murphey, A. B. [Cox College], Ph. B., Student, Smith College, Northampton, Massachusetts.

Ida Christian Reid, Ph. B., Instructor, University of Arizona, Tucson, Arizona.

Minnie Louise Wooddell, Ph. B., Teacher, Tucson, Arizona.

MILITARY ORGANIZATION 1906-7.

UNIVERSITY OF ARIZONA CADET BATTALION.

NATIONAL GUARD OF ARIZONA.

Commandant of Cadets.....
Lieutenant Samuel V. McClure, U. S. A. ; Major,
N. G. A.,

STAFF.

Adjutant.....First Lieutenant George W. Kohler
Sergeant Major.....Frank W. Rose

COMPANY A.

Captain.....Albert R. Buehman
First Lieutenant.....Warren A. Grosetta
Acting Second Lieutenant.....John H. Culin
First Sergeant.....Rollin Brown
SergeantCharles A. Button
Sergeant.....Lawrence A. Calloway
CorporalErnest O. Blades
Corporal.....Charles A. Firth

COMPANY B. (COLOR COMPANY.)

Captain.....Andrew P. Martin
First Lieutenant.....Leslie C. Miller
Second Lieutenant.....Lynne F. Hazzard
First Sergeant.....Leon H. Strong
Sergeant.....Norman A. Rose
Sergeant.....J. Malcolm Henry
Corporal.....J. Urbano Salazar
Corporal.....H. Oliver Coles

TRUMPETERS.

Sergeant.....	Alex. G. Lulley
Corporal.....	Sidney F. Mashbir
Private.....	Frank M. Cannon
Private.....	Joe Peggs
Private.....	C. Wendell Kuencer

COLOR GUARD.

Color Sergeant.....	Howard W. Estill
Acting Color Sergeant.....	Alvan C. Gillem, Jr.
Corporal.....	Benjamin F. Clark
Corporal.....	G. Kemper Mason

At the annual Military Competitive Drill, June 5, 1906, Company B, then commanded by Capt. Buehman, won the honor of carrying the colors for the next year, and Cadet Rollin Brown won the University medal in the individual competition.

REGISTER OF STUDENTS.

1906-7.

GRADUATE STUDENTS.

Ashworth. A. May, A. B. (Smith), French.....Tucson
Packer, Florence Eastman, (Smith), Spanish.....
.....Malden, Mass.
Schaffelberger, Mrs. G. E., A. B. (Nebraska), Span-
ish.....Tucson

SENIORS.

Alexander, Charles.....Tempe
Brown, Harriet Estella.....Tucson
Croasdale, Lawrence Brodhead.....
.....Delaware Water Gap, Pa.
Purcell, Weda Ina.....Tucson
Wolflin, Hugh Maupin.....Tucson

JUNIORS.

Barthels, Frederick.....San Francisco, Cal.
Chapin, Theodore.....Flagstaff
Holbrook, Horace Rollin.....Yreka, Cal.
Mellgren, Walter Give.....Tombstone
Murphey, Robert Bivins.....Tucson
Tarr, William Arthur.....Tucson
Vrooman, John Jacob.....Schenectady, N. Y.

SOPHOMORES.

Birkner, Hugo Ernest.....Lincoln, Neb.
Bradstreet, Carroll Pitkin.....New York City
Buehman, Albert RexTucson

Dane, Harry Chase, A. B. (Occidental).....	Los Angeles, Cal.
Dinsmore, Benjamin Scott.....	Parnassus Pa.
Drew, William Franklin	Mesa
Edwardes, Vance Philipps.....	Berkeley, Cal.
Harwick, Ralph N.....	Buffalo, N. Y.
Hatcher, Burrell R.....	Douglass
La Baree, Grace Ysabel.....	Tucson
Newton, Raymond Austin.....	Patchogue, N. Y.
Ruthrauff, John Mosheim	Tucson
Thompson, Arthur Perry.....	Tucson
Washington, Herbert A.....	Schenectady, N. Y.
Wilkerson, Mabel.....	Yuma

FRESHMEN.

Barker, Norman M.....	Imuris, Mexico
Blades, Ernest Orrin.....	Roosevelt
Calloway, Lawrence Arthur.....	Tucson
Clark, Ewing.....	Tucson
Doan, Fletcher Morris, Jr.....	Tombstone
Ekey, Alice Bertha.....	Salina, Kan.
Engle, John Jacob.....	Buffalo, N. Y.
Grossetta, Warren Arthur.....	Tucson
Hazzard, Lynne Franklin.....	Bisbee
Henley, Louise.....	Davenport, Ia.
Hoyt, Joseph Clyde.....	Jerome
Jones, Percy Wonson.....	Christmas
Kohler, George William.....	Tucson
Martin, Andrew Philip.....	Tucson
Nash, Willard Henry	Buffalo, N. Y.
O'Connell, Thomas Sarsfield (2d semester)	Tucson
Post, Anita Calneh.....	Yuma
Rebstock, Duane.....	Phoenix

UNCLASSIFIED—COLLEGE.

Allen, Eloise Mildred—History.....	Tucson
Blackwood, Mrs. Evelyn—English, Economics....	Bisbee
Brady, Margaret Anna—History.....	Tucson
Briggs, Susan—English, Stenography	Tucson
Clingan, Bernal Herbert—Chemistry, History....	Tucson
Cocke, Charles Lewis—English, History, Econom- ics.....	Roanoke, Va.
Crable, Francis Drake—Chemistry, Geology, Min- eralogy	Tombstone
Culley, Edith Emily—Pedagogy.....	Tucson
Goodin, Frances Earle—History.....	Tucson
Gould, Joseph L.—Geology, Civil Engineering, Chemistry	Bisbee
Hochderffer, George—Botany.....	Flagstaff
Hochderffer, Mary J.—Botany.....	Flagstaff
Hooper, Ethel A.—Spanish.....	Berkeley, Cal.
Mitchell, J. Henry—English, Economics, Spanish,	Cananea, Mex.
Morrison, Elizabeth S.—History, French, Spanish,	Chicago
Olson, Charles Henry—Spanish.....	San Pedro, Cal.
Roberts, Dorothea—English.....	Hartford, Conn.
Rogers, Mrs. Annie—History, Botany.....	Tucson
Scow, Oliver—Civil Engineering, Physics....	Dos Cabezas
Spires, Alice—History.....	Tucson
Tarr, Carolyn G.—English, Botany, Spanish.....	Tucson
Wren, Ina May—Spanish, English.....	Tucson
Wright, William Edward—Latin, Philosophy.....	Tucson
Payne, Lena Hartsfield—Spanish, English, Stenog- raphy	Tucson
Pease, Ione Gertrude—English, Economics.....	Tucson

FOURTH PREPARATORY.

Ballinger, Hugh Hutchinson.....	Tucson
Drachman, Myrtle Augustine	Tucson
Duffy, Mary Margaret.....	Tucson
Elliott, Irene	Tucson
Elliott, Gordon	Clifton
Goldtree, Estella Esther.....	Tucson
Leslie, Beppie.....	Tucson
Lulley, Alex Gray.....	Nogales
Millar, Leslie Creighton.....	Tucson
Murphey, Elizabeth Ella.....	Tucson
Purcell, Ivy Mae.....	Tucson
Ratliffe, George T.....	Wichita
Rider, Jane Herbst.....	Tucson
Rose, Frank Winfred.....	Livingston
Rose, Norman Allan.....	Livingston
Ryder, Frank.....	Tucson
Sine, Eva Jessie.....	Tucson
Steele, Willard Penn.....	Mansfield, O.
Strong, Leon Henri.....	Tucson
Temm, Edward Byrne.....	Tucson

THIRD PREPARATORY.

Angius, John.....	Bisbee
Batte, Benjamin Homer.....	Tucson
Beck, Charlotte Ellen.....	Tucson
Bennie, Florence Mary.....	Clifton
Brown, Kenneth Brooke.....	Tucson
Brown, Marguerita Bernice.....	Tucson
Brown, Rollin.....	Tucson
Button, Charles Aca	Williams
Carpenter, Leslie Lucile	Tucson
Coles, Henry Oliver	Bisbee

Corda, Mamie Wilhelmina.....	Tucson
Culin, John Harding.....	Tucson
Dannemiller, Charles Raymond.....	McCabe
Decker, Hazel.....	Tucson
Duffy, Alice Elizabeth.....	Tucson
Duffy, Harriet Loretta.....	Tucson
Edgerton, Ambrose Earl.....	Cananea, Mex.
Emmons, Thomas Guy.....	Pearce
Estill, Howard Wilmot.....	Tucson
Firth, Charles Abraham.....	Aravaipa
Galindo, Edwin Arthur.....	Tucson
Huddleston, Julian.....	Tucson
Kohler, Barbara.....	Tucson
Long, Robert Kistner.....	Tucson
McNeil, Clara May.....	Tucson
Mashbir, Sidney Freudenthal.....	Safford
Maverick, Reuben.....	San Antonio, Texas
Millar, Edward B.....	Tucson
Nielsen, Gwynne Eleanor.....	Tucson
Nisihihara, George.....	Tucson
Pritchard, Stella M.....	Tucson
Purcell, Marie E.....	Tucson
Pusch, Henrietta.....	Tucson
Simonds, Marie Theresa.....	Hermosillo, Mex.
Sine, Janet.....	Tucson
Smith, Felicia.....	Globe
Trippel, Amy Irene.....	Tucson
Weeks, Raymond Jackson.....	San Carlos
White, Edwin Henry.....	Cochise
Whitwell, Sturges Bigelow.....	Tucson
Wooddell, Florence Ella.....	Tucson

SECOND PREPARATORY.

Allison, Josephine.....	Tucson
Baker, Agnes Mary.....	Helvetia
Barker, Lawrence Ward.....	Imuris, Mex.
Bohannon, May S.....	Tucson
Campbell, William Riggs.....	Tucson
Cannon, Frank Mullen.....	Congress
Christie, Gerald Franklin.....	Tucson
Clark, Benjamin Harrison.....	Benson
Cole, Carl Henry.....	Globe
Estabrook, Florence E.....	Tucson
Gillem, Alvan Cullam, Jr.,.....	Fort Huachuca
Goldring, Abraham.....	Tucson
Hardicker, Fred Earl.....	Douglass
Hawke, Viola May.....	Tucson
Henry, James Malcolm.....	Tucson
Henry, Lena Beatrice.....	Tucson
Huddy, Viola Edith.....	Pearce
Hughes, Mary Annetta.....	Tucson
Hughes, Wesley Rowland.....	Tucson
Jones, Mary Virginia.....	Tucson
Jones, Sidney Raymond.....	Tucson
Knestric, Emma Frances.....	Tucson
Lovejoy, Arthur L.....	Tucson
McAneny, Evelyn Grace.....	Cananea, Mex.
McClure, John Clarendon.....	Tucson
Mason, G. Kemper.....	San Diego, Cal.
Mobley, Janet Editha.....	Tucson
Morales, Theresa.....	Tucson
Morgan, Ethel Rose.....	Willcox
Pantosky, Rose.....	St. Helena, Cal.
Pusch, Wilhelmina.....	Tucson

Rodgers, Helen.....	Canaille
Roletti, Charles John, Jr.,	Tucson
Russell, Selina.....	Tucson
Shaw, Harry Downing	Cananea, Mex.
Smith, Charlotte Ellen.....	Globe
Soto, Lucretia.....	Willcox
Williams, Isaac Jackman.....	Congress Junction
Wooddell, De Leslie.....	Tucson

FIRST PREPARATORY.

Bennett, Harry Schlitz.....	Phoenix
Bennett, Jarvis Dant	Maricopa
Bennie, Isobel.....	Clifton
Brown, Harriet Anna.....	Tucson
Cappleman, Treasy M.....	Tucson
Cole, Oscar Campbell.....	Bisbee
Copeland, Will.....	Tucson
Davis, Henry George.....	Willcox
De Corse, Benjamin Franklin.....	Yuma
Dicus, Ruby Maud.....	Douglass
Durazo, Pedro.....	Tucson
Dutton, Charles Allen.....	Flagstaff
Emmons, Harriet.....	Pearce
Helsel, Nettie.....	Tucson
Hoffman, Gladys Beula.....	Tucson
Jenkins, Alta.....	Tucson
Kuencer, Charles Wendell.....	Kingman
Kuencer, Walter Ernst.....	Kingman
Lemons, Charles Robert.....	Pearce
Lindsley, R. G.....	Tucson
McComb, Richard Raymond... ..	Willcox
McReynolds, Walter B.....	Tucson

Nichols, Louise.....	Tucson
O'Connell, Mildred.....	Tucson
Peggs, Jo.....	Rillito
Prewitt, Fletcher Dudley.....	Bowie
Rodriguez, Richard Garcia.....	La Colorado, Mex.
Salazar, José Urbano.....	Chihuahua, Mex.
Soto, Ernest Steve.....	Willcox
Wien, Mary Theresa.....	Johnson

UNCLASSIFIED—PREPARATORY.

Bailey, Ella A.—Spanish, Bookkeeping.....	Tucson
Clark, Mary Ellen—English.....	Tucson
Farish, Thomas Edward—Chemistry, Algebra, Physics.....	Phoenix
Foster, George S., Jr.,—Chemistry, Mathematics, Physics.....	Tucson
Francis, Mary Agnes—Stenography.....	Tucson
Lord, Alexander—English, Shopwork and Draw- ing.....	Lampazos, Mex.
Robles del Campo, José—English, Shopwork and Drawing.....	
Salgado, Lucio—English, Bookkeeping....	Lapaz, Mex.
Scholefield, Helen Mar—Stenography.....	Tucson
Soto, Lydia—Geometry, Spanish.....	Willcox
Wien, Gertrude Estelle—English, Bookkeeping..	Johnson
Wien, Parthenia—English, Stenography, Book- keeping.....	Johnson

SUMMARY.

Graduate Students.....	3
Seniors	5
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VOLUME 1, No. 2.

MAY, 1908.

REGISTER

1907-8

ANNOUNCEMENTS

1908-9

PUBLISHED BY THE
UNIVERSITY OF ARIZONA
TUCSON, ARIZONA
1908

TUESON STREET RAILWAY

THIRD ST

PARK AVE

FOURTH ST

TANQUE VERDE ROAD

Athletic Field

CACTUS
GARDEN

Parade Grounds

LIBRARY

SOUTH HALL

GYMNASIUM

MAIN
BUILDING

MANUAL
TRAINING

DINING
HALL

NORTH
HALL

WILL

—LEGEND—

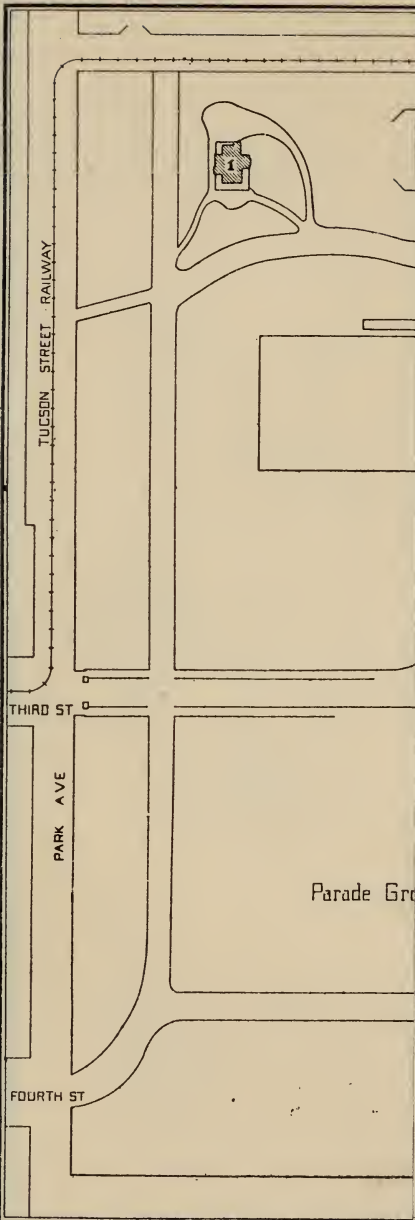
- 1 COTTAGES
- 2 GREEN HOUSES
- 3 POWER HOUSE
- 4 METEOROLOGICAL STA
- 5 ASSAY DEPT
- 6 DOMESTIC SCIENCE COTTAGE

Map of the
Campus
UNIVERSITY
OF
ARIZONA.

TUCSON A.T.

Student Surveys
Scale

240 Feet to 1 Inch.



—=LEGEND=—

- 1 COTTAGES
- 2 GREEN HOUSES
- 3 POWER HOUSE
- 4 METEOROLOGICAL STA
- 5 ASSAY DEPT
- 6 DOMESTIC SCIENCE COTTAGE

Map of the
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ARIZONA.

TUCSON A.T.

Student Surveys
Scale


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UNIVERSITY OF ARIZONA

SEVENTEENTH YEAR
1907 - 1908

ANNOUNCEMENTS
1908 - 1909

TUCSON, ARIZONA
Citizen Printing and Publishing Co.
1908



CALENDAR.

1908.

Sept. 17, Thursday }	Entrance Examinations.
Sept. 18, Friday }	Condition Examination.
Sept. 21, Monday	Registration Day.
Sept. 22, Tuesday	First Semester begins.
Nov. 25, Wednesday	Thanksgiving recess begins.
Nov. 30, Monday	Instruction resumed.
Dec. 23, Wednesday	Holiday recess begins.

1909.

Jan. 4, Monday	Instruction resumed.
Jan. 29, Friday	First Semester ends.
Feb. 1, Monday	Second Semester begins.
May 30, Sunday	Baccalaureate Discourse.
June 1, Monday	Exhibition Military Dept.
June 2, Wednesday	Commencement.

BOARD OF REGENTS.

Ex-Officio.

HON. JOSEPH H. KIBBEY.....Phoenix
Governor of the Territory.

HON. R. L. LONG.....Phoenix
Superintendent of Public Instruction.

Appointed by the Governor.

Term expires.

HON. MERRILL P. FREEMAN, Tucson.....August, 1909
Chancellor.

HON. GEORGE J. ROSKRUGE, Tucson.....August, 1909
Secretary.

HON. CHARLES H. BAYLESS, A. M., Tucson. August, 1909
Treasurer.

HON. A. V. GROSSETTA, Tucson..... August, 1911

Regular meetings on the 10th of each month.

FACULTY.

KENDRIC CHARLES BABCOCK, Ph. D.

B. L., 1889, Minnesota; A. M., 1895, Harvard; Ph. D., 1896, Harvard.
President; Professor of History and Economics. 1903.*

WILLIAM PHIPPS BLAKE, A. M.

Ph. B., 1852, Yale; A. M., Dartmouth; D. Sc., 1907, Pennsylvania
Professor of Geology, Emeritus. 1895.

ROBERT HUMPHREY FORBES, M. S.

B. S., 1892, M. S., 1895, University of Illinois.
Director and Chemist, Agricultural Experiment Station. 1894.

†FRANK NELSON GUILD, M. S.

B. S., 1894, M. S., 1903, Vermont.
Professor of Chemistry and Mineralogy. 1897.

GEORGE EDSON PHILIP SMITH, C. E.

B. S., 1897; C. E., 1899, Vermont.
Irrigation Engineer, Agricultural Experiment Station. 1900.

JOHN JAMES THORNBURGH, A. M.

B. S., South Dakota (Agricultural); B. S., 1897, A. M., 1901, Nebraska.
Professor of Biology; Botanist, Agricultural Experiment Station. 1901.

SAMUEL VICTOR McCLURE

First Lieutenant, U. S. A., 1896, West Point.
Professor of Military Science and Tactics. 1904.

EDWIN MORTIMER BLAKE, Ph. D.

Engineer of Mines, 1890; Ph. D., 1893, Columbia.
Professor of Mathematics and Mechanical Engineering. 1904.

*Dates following titles indicate appointment to service in the University.

†Leave of absence, 1908-9.

SIDNEY CARLETON NEWSOM, A. M.

A. B., 1895, Harvard; A. M., 1898, Chicago.
Professor of English. 1904.

CYRUS FISHER TOLMAN, Jr., B. S.

B. S., 1896, Chicago.
Professor of Geology and Mining Engineering, 1905.

ALBERT EARLE VINSON, Ph. D.

B. S., 1901, Ohio (State); Ph. D., 1905, Goettingen.
Associate Chemist, Agricultural Experiment Station.
1905.

CHARLES ALFRED TURRELL, A. M.

B. S., 1896, Nebraska; A. M., 1901, Missouri.
Professor of Modern Languages. 1904.

LESLIE ABRAM, WATERBURY, C. E.

B. S., 1902; C. E., 1905, Illinois.
Professor of Civil Engineering.

ROBERT RHEA GOODRICH, M. S.

B. S., (Mining), 1885; B. S., (Mechanical Eng.), 1901; M. S., 1902, Mass
Inst. Technology.
Professor of Metallurgy. 1907.

ROBERT WAITMAN CLOTHIER, M. S.

B. S., 1897; M. S., 1899, Kansas (Agricultural).
Professor of Agriculture and Conductor of Farmers
Institutes. 1907.

J. ELIOT COIT, Ph. D.

B. S., North Carolina; M. S., 1905; Ph D., 1907, Cornell.
Associate Horticulturist, Agricultural Experiment
Station. 1907.

WILLIAM WHEELER HENLEY, A. B.

A. B., 1905, Leland Stanford, Jr.
Professor of Mechanic Arts. 1905.

ANDREW ELLICOTT DOUGLASS, A. B.

A. B., 1889, Trinity.
Professor of Physics and Astronomy. 1906.

WILLIAM BURNETT McCALLUM, Ph. D.

B. S. A., 1894, Toronto; Ph. D., 1904, Chicago.

Associate Botanist, Agricultural Experiment Station.
1907.

FREDERICK W. WILSON, B. S.

B. S., 1905, Kansas, (Agricultural.)

Associate Animal Husbandman, Agricultural Experiment
Station. 1905.

WILLIAM GEORGE MEDCRAFT, A. M.

A. B., 1898; A. M., 1904, Kansas Wesleyan.

Assistant Professor of Mathematics. 1906.

VICTOR LIDGA, B. S.

B. S., 1904, California.

Assistant Professor of Physical Training and French.
1906.

RAYMOND C. BENNER, M. S.

B. S., 1902, Minnesota; M. S., 1905, Wisconsin.

Assistant Professor of Chemistry. 1906.

MARION CUMMINGS STANLEY, B. L.

B. L., 1900, California.

Instructor in Philosophy. 1902.

ESTELLE LUTRELL, A. B.

A. B., 1896, Chicago.

Instructor in English; Librarian. 1904.

FREDERICK EDWIN TALMAGE, B. L.

B. L., 1903, California.

Instructor in Stenography and Book-keeping. 1904.

LEVONA PAYNE NEWSOM, Ph. D.

A. B., 1892; Ph. D., 1895, Franklin.

Instructor in Latin. 1905.

OPAL IONE TILLMAN, B. S.

B. S., 1905; M. S., 1906, Ohio State.

Instructor in Domestic Science and Botany. 1906.

IDA CHRISTINA REID, Ph. B.

Ph. B., 1906, Arizona.

Instructor in History and Mathematics. 1906.

CHARLES GUY HOOVER

Rochester College (Indiana.)

Instructor in Music.

MARY JOHNSTON HOCHDERFFER

B. A., 1903, Toronto.

Instructor in Modern Languages and English. 1907.

ESTHER EVERETT LAPE, B. A.

B. A., 1905, Wellesley.

Instructor in English. 1907.

FRANK CALEB KELTON, B. S.

B. S., 1904, Arizona.

Instructor in Civil Engineering and Drawing. 1907.

FRANK OSCAR SMITH, LL. B.

B. S., 1905; M. A., LL. B., 1907, Northwestern.

Instructor in History and Economics. 1907.

WILLIAM HORACE ROSS, Ph. D.

B. S., 1903; M. S., 1904, Dalhousie; Ph. D., 1907, Chicago.

Assistant Chemist, Agricultural Experiment Station
1907.

FREDERICK EDWIN TALMAGE, B. L.

Secretary of the University. 1904.

HERBERT BROWN

Curator Territorial Museum.

LURENA MERRIMAN

Preceptress of Young Women. 1907.

MRS. MARY HENRY AITON, M. D.

M. D. Northwestern.

Medical Examiner for Women. 1905.

ARTHUR W. OLCOTT, M. D.

A. B., 1884, Princeton; M. D., 1887, St. Louis.
Medical Examiner for Men. 1905.

RAYMOND C. BENNER, M. S.

Head of Men's Dormitory. 1907.

WILBUR OLIVER HAYES

Secretary of the Agricultural Experiment Station. 1907.

WALTER M. COLE

Superintendent of Buildings and Grounds. 1907.

RAYMOND C. BENNER, M. S.

Commercial Assayer. 1907.

STUDENT ASSISTANTS.

(Service not continuous through the year in every case.)

H. M. Wolflin	R. Haby
M. M. Carpenter	E. Burgess
E. B. Whiting	E. Engle
W. A. Tarr	S. R. Jones
Burrell R. Hatcher	Lawrence A. Calloway
Theodore Chapin	Pauline Rodgers
Frances M. Babcock	Anita C. Post
Mabel Wilkerson	H. Oliver Coles
B. S. Dinsmore	Frank Cannon
A. Perry Thompson	G. T. Ratliffe
B. F. De Corse	F. W. Rose
B. L. Cheney	W. P. Steele
E. O. Blades	G. S. Foster, Jr.
C. G. Standeford	

STANDING COMMITTEES.

1907 1908.

The President is ex-officio member of all committees.

Executive.

Professors Forbes, Tolman, E. M. Blake.

Registration and Classification.

Professors Guild, E. M. Blake, Newsom, Medcraft.

Library.

Professor Guild, Turrell, Miss Lutrell.

Athletics.

Professors Thornber, Douglass, Mr Lidga.

Public Exercises.

Professor Medcraft, Miss Lutrell

Intercollegiate Debate.

Professors Thornber, Newsom.

Manual Training.

Professors Henley, E. M. Blake, Miss Tillman.

Co-Operative Association.

Mr. Tallmage.

Preparatory Department.

Professors Newsom, Medcraft, Miss Reid.

Rhodes Scholarship.

President Babcock, Professors Newsom, Guild.



UNIVERSITY OF ARIZONA

Established by Act of the Legislative Assembly, 1885;
Open to Students, October, 1891.

PURPOSE AND ORGANIZATION.

The University of Arizona is an integral part of the system of public education established by and for the Territory, and aims, as the head of such system, to fill the same position as that occupied by the State universities in such States as California and Wisconsin. Its general organization is in accordance with the Act of Congress of July 2, 1862 known as the Morrill Act, creating the "Land Grant Colleges;" the details of its organization and government are regulated by the Act of the Legislative Assembly of the Territory of Arizona, passed in 1885 and embodied, with amendments, in the Revised Statutes of Arizona Territory, 1901, which vests the government of the institution in a corporation styled the Board of Regents of the University of Arizona, consisting of the Governor and Superintendent of Public Instruction of the Territory, *ex officio*, and four other members appointed by the Governor for a term of four years.

In creating the University, the Legislative Assembly wisely followed the example of the great States of Wis-

consin, Illinois, Minnesota, Nebraska, and California, in unifying under one management the various schools and institutions of higher learning or investigation in Arizona,—the colleges of liberal arts, the schools of mines and engineering, the agricultural college, and the agricultural experiment station, which in some States have been widely and completely separated. No professional schools of law, medicine, dentistry, or music have been established. In compliance with the provisions of Act creating it, the University consists of

I. The College of Agriculture and Mechanical Arts.

II. The School of Mines.

III. The Agricultural Experiment Station.

IV. The Preparatory Department.

The Normal Department authorized by the statute has not as yet been organized. The Preparatory Department, which is really a first class manual training high school with a four years course, will gradually disappear as the educational system of the Territory is developed by the establishment of efficient high schools, but no date is set for abolishing even the first year of this preparatory course.

The University in all departments is open to persons of both sexes, who are qualified for admission. Through the aid received from the United States and from the Territory, it is enabled to offer its privileges to residents and non-residents, with only very moderate charges.

The purpose of the University of Arizona is, in the language of the organic law, "to provide the inhabitants of this Territory with the means of acquiring a thorough knowledge of the various branches of literature, science and the arts;" and so far as possible a technical education adapted to the development of the peculiar resources of Arizona. In furtherance of this latter purpose, instruction is provided especially in subjects fundamental to agriculture, the mechanic arts, mining, and metallurgy. The University, by the nature of its situation, frankly lays its strongest emphasis upon the course in mining engineering. It is, in reality, in a great mining laboratory, surrounded as it is on all sides by great mines. Some of these mines developed on a large scale are within a few miles of the city and the number and magnitude of such enterprises are steadily increasing. Probably no University in the United States offers such fine advantages to the students of mining engineering who desire to see the actual operation of great mines, or the development of great enterprises, while carrying on the theoretical and experimental work of the mining course. The advantages in civil engineering are hardly less noteworthy, for Tucson is not only a division point on the main line of the Southern Pacific railroad, with large shops and roundhouses, but it has the administrative and engineering headquarters for five of the subsidiary or allied lines of the Southern Pacific system in Arizona and in Sonora, Mexico, commonly known

as the Randolph lines. All these lines are undergoing extensive expansion and rebuilding, and so furnish excellent opportunities for observation and vacation employment for students of civil engineering.

LOCATION AND CLIMATE.

The University of Arizona is located at Tucson, a city of fifteen thousand inhabitants, on the main line of the Southern Pacific railway, 312 miles west of El Paso, Texas, and 500 miles east of Los Angeles, Cal. The city lies in a broad, flat valley at an elevation of 2,400 feet above sea level and is surrounded by mountains. Its dry, mild, and equable climate has made Tucson a famous winter resort unsurpassed for healthfulness.

The winter climate is especially good; the temperature is cool and strengthening but not severe, the lowest temperature recorded during the average year being about twenty degrees above zero, Fahrenheit. Little rain falls during the winter; fogs are all but unknown; cloudy days are rare. The percentage of sunshine throughout the winter is greater than that recorded at any other place in the United States. Owing to the extreme dryness of the air the highest temperatures known are less oppressive to the senses and less dangerous to the health than the summer heats of the upper Mississippi Valley States. The total amount of rainfall averages less than twelve inches.

These advantages insure to students a comfortable

education and a wide range of out-door sports and recreations throughout the college year.

The University Campus, consisting of fifty-five acres, is situated upon high ground about a mile from the business center of the city with which it is con-side by an excellent electric street-car line. On every side it commands a view of mountain scenery of remarkable extent and grandeur. The buildings are lighted by electricity furnished by the city plant.

An abundant supply of unusually good water for household, laboratory and irrigation purposes is drawn from a large well on the Campus from a depth of one hundred and twenty feet.

The grounds have been carefully laid out in drives, lawns and gardens. A large number of palm, olive, umbrella, ash, pepper, bagota and cottonwood trees give the Campus the air of a well kept park.

BUILDINGS.

The main building, University Hall, is 200x150 feet, two stories in height; the first story of gray stone, the second of red brick. It is completely surrounded by a wide two-story veranda. The building contains recitation rooms, laboratories and apparatus rooms of various departments, an assembly room, and the office, laboratories and library of the Agricultural Experiment Station.

The library and museum building, costing about \$32,000, including furnishings, was occupied in January, 1905. It is a handsome building of red brick

and Bedford sandstone, with a massive tile roof. The interior finish is in natural oak and pine. The offices of the president and secretary of the University, three lecture rooms for the departments of geology, mathematics, English and history, work rooms for the library and museum, and a laboratory for the department of geology are on the first floor. The Library reading room, on the second floor is a large, well-lighted room, beautifully furnished with heavy solid oak reading tables, desks and wall cases. The stack-room at the rear is fitted up with the most modern steel stacks. The Museum occupies part of the first floor and the west half of the second floor. Fine oak and plate glass cases constitute the furnishings.

North Hall, a dormitory two stories in height, built of gray stone of fine quality, is occupied by the college men. Besides the parlor, and rooms of the instructors in charge, it contains seventeen rooms, each large enough to accommodate two students, besides bath and toilet rooms.

South Hall, a large brick building containing forty rooms, besides bath and toilet rooms and store rooms, is the dormitory mainly for preparatory students. It is heated by a hot-water system. It will accommodate seventy-five students.

West College and its new four-room annex are the dormitories for young women,—a two story brick house with wide porches, surrounded with vines, shrubbery, lawns and trees.

The Dining Hall, built of red brick, provides ample boarding accommodations for all persons living on the campus.

The Shop and Assay building is a large, substantial brick structure. It contains a commodious drawing room for mechanical and free-hand drawing, a large laboratory for forge work, machine practice and carpentry and a laboratory, instrument room and lecture room for the department of civil engineering. Two other rooms are used for lockers, and for the motor and engine. The assay laboratory and commercial assaying department occupy five rooms fully equipped with a large melting furnace, the necessary muffle furnaces, and other accessories for making complete and accurate assays.

The Mill or Mining Machinery building, located to the northeast of the main group of buildings, is a plain wooden structure in which are placed the stamp-mills, jigs, concentrating tables, separators, etc., necessary for the mining laboratory.

Herring Hall the gymnasium, is a very substantial high building, 40x80 feet, constructed of red brick and white plaster. It was erected in 1903, the gift of Professor James Douglas and his associates of the Copper Queen Consolidated Mining Company, through Colonel William Herring, after whom it was named.

The pump house and mechanical engineering laboratory was built in 1905. By the use of brick,

cement and iron it is practically fire proof, thus insuring safety to the well and pumps supplying the University with water for all its uses.

Two two-story brick residences are occupied by the President of the University and by the Director of the Agricultural Experiment Station.

Other buildings are the cottage occupied by the department of domestic science, three green houses, a brick barn, and various smaller out-buildings used for shops and store rooms.

MAINTENANCE.

The University is maintained by funds appropriated by the United States and by the Territory of Arizona. Fifty-seven sections of very valuable pine land in Coconino County have been set apart by the Federal Government for the benefit of the University, but title and control of the land does not pass to the Board of Regents until the Territory is admitted as a State. In the meantime, only a very small sum is annually received from the leases of this land.

By the provisions of the Morrill Act of 1890, the University receives annually from the United States the sum of \$25,000 "to be applied only to instruction in agriculture, the mechanic arts, the English language and the various branches of mathematical, physical, natural and economic science, with special reference to their applications in the industries of life, and to the facilities for such instruction." This Morrill Fund is to be ultimately duplicated by the "Nel-

son Fund," created by the Act of March 4, 1907, which appropriated \$5,000 for the year beginning July 1, 1907 and provided for an annual increase of \$5,000, until the total received by each State should be \$50,000 per year from the two funds. The University receives from the same source, for the support of the Agricultural Experiment Station, \$15,000 yearly from the Hatch Act of 1887; the Adams Act of 1906, for the current year, appropriates \$9000 which is to be increased annually by \$2000 until it also produces \$15,000, giving the Station ultimately \$30,000 per year.

The appropriations by the Territorial Legislative Atssembly of 1907 were \$33,000 per year, for two year, for maintenance, \$5,600 for the work of the Agricultural Experiment Station, and \$40,000 for improvements (\$20,000 to be available January 1, 1908, and \$20,000 on January 1, 1909). This last sum will be used in the construction of a science building for the departments of chemistry, physics, and biology, plans for which have already been accepted by the Board of Regents. The building should be ready for occupancy by the spring of 1909.

The University also receives annually, from miscellaneous sources such as matriculation and tuition fees, rent of cottages, damage to University property, etc., about \$1400. The receipts for board, lights, etc., amount to about \$16,000 per year.

EQUIPMENT.**LIBRARY.**

The library contains 13,000 bound volumes and 12,000 pamphlets, and is open for the use of all students. Of these volumes a collection of complete sets of scientific and literary periodicals, to which additions are being made yearly, is of special service in reference work. The library was made a regular depository of United States Government documents in 1907.

The books are classed by the decimal system and shelved in numeric order with a further author division according to the Cutter numbers. The catalogue is the usual dictionary card catalogue of authors, subjects and titles in one alphabetical arrangement. Library of Congress cards are used whenever obtainable. The Reading Room is supplied with about 600 books of general reference which may be consulted by the students without any formality. The following current periodicals and newspapers are on file for the use of students and general readers in the Reading Room:

PERIODICAL LIST.

*Advocate of Peace,	American Chemical Jour-
American Architect and	nal,
Building News,	American Chemical Soci-
American Blacksmith,	ety Journal,

Donated

- *American Economist,
 American Historical Review,
 American Institute of Mining Engineers, Transactions,
 American Journal of Pharmacy,
 American Journal of Science,
 American Journal of Sociology,
 American Machinist,
 American Magazine,
 American Mathematical Society, Bulletin,
 American Mathematical Society, Transactions,
 American Naturalist,
 Arena,
 Annales des Mines,
 Australian Mining Standard,
 *Arizona Mining Review,
 Association of Engineering Societies, Journal,
 Athenaeum,
 Atlantic Monthly,
 Biedermann's Zentralblatt fur Agrikulturchemie,
 Bookman,
 Botanical Gazette,
 Botanisches Centralblatt,
 *California Cultivator,
 Canadia Entomologist,
 Canadian Mining Journal
 *Canal Record,
 Cassier's Magazine,
 Cement,
 Century,
 Chemical News,
 Chemical Society, Journal, (London)
 Chemisches Centralblatt,
 Coke and Coke,
 Collier's Weekly,
 Craftsman,
 Cumulative Book Index,
 Current Literature,
 Delineator,
 Duetsche Chemische Gesellschaft, Berichte,
 Dial,
 Economic Geology,
 *Educational Gazette,
 Educational Review,

Electrical World,	International Studio,
Electrochemical and	Irrigation Age,
Metallurgical Industry,	Journal of Geography,
Engineering and Mining	Journal of Geology,
Journal,	Journal of Political
Engineering Magazine,	Economy,
Engineering News,	Ladies' Home Journal,
Engineering Record,	Litterarisches Z e n t r a l-
Espana Moderna, La.	blatt,
*Farmer's Voice,	Literary Digest,
Fern Bulletin,	Living Age,
Forestry and Irrigation,	*L o w e l l Observatory,
Forum,	Bulletin,
Franklin Institute, Jour-	McClure's Magazine,
nal,	Manual Training Maga-
Geological Magazine,	zine,
Geological Society of	Mines and Minerals,
America, Bulletin,	Mining and Scientific
Geologisches Centralblatt,	Press,
Good Housekeeping,	*Mining Reporter,
Graphic, (London)	*Mining Review,
Harper's Monthly Maga-	Mining Science,
zine,	*Mining World,
Harper's Weekly,	Nation,
Institut de France, Paris,	New Zealand Mines Rec-
Academie des Sciences,	ord,
Comptes rendus des	Nineteenth Century and
Seances.	After,

North American Review,	School of Mines Quar-
*Our Dumb Animals,	terly,
Out West,	Science,
Outing,	Scientific American,
Plant World,	Scientific American, Sup-
Poet-lore,	plement,
Popular Science Monthly,	Society of Chemical In-
Power,	dustry, Journal,
*Prairie Farmer,	Scribner's Magazine,
Public Libraries,	Societe Francaise de Min-
Publishers' Weekly,	eralogie, Bulletin,
Reader's Guide to Peri-	World's Work,
odical Literature,	Zeitschrift fur Anorg-
Review of Reviews,	anische Chemie,
Revue des Deux Mondes,	Zeitschrift fur Physikal-
School Review,	ische Chemie,

NEWSPAPERS ON FILE IN THE READING ROOM.

*Arizona Blade,	*Graham County Guard-
*Arizona Bulletin,	ian,
Arizona Daily Star,	Mojave County Miner,
*Arizona Gazette,	*Oasis,
Arizona Range News,	Prescott Weekly Courier,
*Arizona Silver Belt,	Southwestern Stockman,
Arizona Weekly Journal	*Tempe News,
Miner,	Tucson Citizen,
Bisbee Review,	Tucson Post,
Coconino Sun,	Tombstone Epitaph,
Los Angeles Times,	Weekly Republican.

The Carnegie Library of the city of Tucson is also open to the use of the students of the University. This library is also a depository of United States Government documents.

MUSEUM.

The Seventeenth Legislative Assembly of Arizona established a general museum at the University, to promote the collection of materials of all kinds illustrating the resources and development of Arizona, and particularly to preserve historical relics, including those pertaining to the aboriginal inhabitants. Donations of specimens and collections will be received and acknowledged with thanks, but no special provision has yet been made by the legislature for the support of this department, aside from a small appropriation for the salary of a curator.

The professors of the University have the immediate care of the collections pertaining to their respective departments. The collections now displayed at the University comprise representative series of minerals, ores and rocks of Arizona. Among these may be particularly mentioned superb specimens from the mines of the Copper Queen at Bisbee. There are also collections of typical rocks and minerals for comparison, and many specimens of ores from different parts of the United States and from abroad. It is desired to make the collection of ores and minerals fully represent the great mineral resources of Arizona.

A large amount has been recently spent upon new

cases for the Museum in its new quarters, and the material thus re-arranged and displayed in good light becomes doubly attractive and useful.

The Museum is indebted to Mr. Herbert Brown, curator, for a large and valuable collection of skins of the birds of Arizona, which he has deposited in the Museum, as well as for a collection of ancient aboriginal pottery and other relics. The fossil skull and teeth of an elephant and other fragmentary remains of extinct animals sent from Yuma by Mr. Brown deserve special mention.

Historical records of much value are gradually accumulating as a part of this Museum, and an appeal is made to old settlers and others to bear this fact in mind when making disposition of articles bearing even remote relation to the early pioneers and their history. All records and data of any nature that can be gleaned are worthy of preservation, and it is earnestly desired to have them placed at the University, where they will always be accessible for reference.

BIOLOGY.

The biological laboratories are located on the second floor of University Hall. They are convenient and well-lighted, and the equipment is such as is required for modern instruction and research in the biological sciences. The library and apparatus are well selected and adapted to the region and the courses offered.

The collections possessed by the department form a very important part of its equipment. The herbarium

consists of 12,000 sheets of mounted plants, of which number 2,500 are included in the University botanical survey herbarium. The unique flora and fauna of the mountain, mesa and lowland collecting grounds, in close proximity to the institution, offer very attractive opportunities for instruction and research especially along ecological lines. The Desert Botanical Laboratory of the Carnegie Institution supplements in most admirable fashion the facilities of the University for investigation.

In addition to the above there are fifty cases of insects, a large case of seeds, articulate and disarticulate human skeletons, plaster and papier-mache models of the important structures of the human anatomy, and duplicate material for study and dissection.

CHEMISTRY.

The chemical laboratories used for instruction are two in number. That used by beginners in the study of general chemistry and qualitative analysis is on the second floor of University Hall, and is equipped for the experimental and theoretical study of chemical science.

The laboratory for quantitative analysis is on the first floor of University Hall. It is thoroughly equipped for the teaching of volumetric and gasometric analysis, blow-pipe analysis, metallurgical chemistry, and wet and fire assaying, including apparatus for the electrolytic determination of metals.

The balance room contains analytical and bullion

balances of the latest model so arranged as to insure a maximum of stability and accuracy. A lecture and demonstration room fitted with sinks, cabinets, etc., completes an equipment of apparatus and collections adequate for first-class instruction in both theoretical and practical chemistry.

The laboratories of the Agricultural Experiment Station occupy three rooms on the first floor. These are devoted to analytical work and chemical investigations relating to agriculture. Though not intended for the use of students they are of incidental value to the instructors and students through the investigations which are here conducted.

MINERALOGY AND PETROGRAPHY.

The laboratory for quantitative analysis is used for determinative mineralogy and blow-pipe analysis. The laboratory is supplied with necessary apparatus for student work, including glass and wooden models for the study of crystallography, hand and reflecting goniometers for the measurement of the angles of crystals, a polariscope for the study of optical properties of minerals, and a type set of 600 minerals.

For the study of petrography the laboratory is supplied with a type set of rocks classified according to Rosenbusch's *Elemente der Gesteinlehre* with thin sections corresponding, four petrographic microscopes, a collection of oriented sections of minerals and apparatus for studying interference phenomena.

PHYSICS.

Three rooms on the first floor of University Hall are set apart for the teaching of physics. The facilities for experimental demonstration of all important phenomena are very complete. The lecture room is fitted with shutters so that it can be darkened. A beam of sunlight directed by a fine clock heliostat outside may be thrown steadily across the lecture table for experiments on light, or for use in connection with the solar lantern for a variety of other work. Adjacent to the lecture room are the laboratories and the apparatus room. Both lecture room and laboratories are supplied with water and gas.

An eight-inch Willyoung induction coil with storage and X-ray accessories is used in the study of high-tension electricity. Through the generosity of the Honorable Mark J. Egan, of Clifton, the University added to its equipment for the study of electricity a fine imported set of miniature wireless telegraphy apparatus, capable of transmitting messages about two hundred feet.

This department also has a double dissolving arc-light Ideal stereopticon, and projectoscope which are used by various other departments of the University and for public lectures before the students.

MATHEMATICS.

Models are an important aid to the study of mathematics. The collection of the department includes thread models of about forty ruled surfaces of the

third, fourth and sixth orders. These illustrate the theory of surfaces and are also valuable in the study of kinematics and linkages.

The Bulletin and Transactions of the American Mathematical Society, and the Encyklopedia der Mathematischen Wissenschaften are subscribed for by the University Library.

MINING ENGINEERING AND METALLURGY.

The Mill, or mining engineering and metallurgical laboratory, is equipped for use by the students of metallurgy in connection with their work in testing ores as to their adaptability for treatment by different processes both on a large and small scale.

The chief features of the equipment are: a Blake crusher, 4 in. by 7 in.; a Dodge crusher, 4 in. by 6 in.; sampling rolls, 6 in. by 9 in.; a cone and burr sample grinder; a pebble mill with a capacity of about 15 lbs. at one charge; a laboratory lightning crusher and a disc pulverizer; a 5-stamp mill, with 800-pound stamps; a 3-stamp mill, with 250 lb. stamps; inside and outside amalgamated plates for the same; a 2 ft. clean-up pan; a 1 ft. amalgamation pan, and a 9 jar revolving agitator for testing samples of a few ounces; a No. 5 Wilfley table of the latest pattern, and a Hallett hand jig; a 1 1-2 ton cyanide plant for treating sands or dry crushed ore; two 150 lb. cyanide plants for treating smaller samples 3 ft. agitator; a 12-in., 6-chamber, flush plate and frame, washing filter press and pump for the same; a Sturtevant shaking screen; a Tullock

ore feeder, a belt and bucket elevator, sampling plates, split samplers, a shaking screen, percolators, sizing screens from 1-mesh to 200-mesh, miner's pans, bateas, retorts, etc.

The power for operating this plant is furnished by a 30 h. p. Westinghouse induction motor, type C.

The assay laboratory is equipped with assay furnaces for crucible work, for scorifying and cupeling, and for retorting mercury from amalgam, besides all needed appliances for assaying by dry and wet method including electrolysis. The laboratory also has desks and fittings for the chemical work required in the metallurgical and mineralogical investigation and analysis of ores, in mineral fertilizers, and in qualitative tests of minerals.

CIVIL ENGINEERING.

The apparatus in this department has been chosen with the view of familiarizing the student with the instruments which are used in practical civil engineering work and in the allied branches of hydraulic and mining engineering. The equipment includes surveyors' and engineers' levels; plane table; stadia, level, and transit rods; aneroid barometers; odometer; automatic water registers; hook gauges; current meters; drafting instruments; mechanical calculators; planimeter; a complete set of apparatus for testing cement; and an Olsen Universal testing machine of 100,000 pounds capacity.

MECHANICAL ENGINEERING.

This department has a drafting and recitation room in the Library Building in addition to the regular drawing rooms of the department of Mechanic Arts. In this room is the catalogue file containing the trade literature of about five hundred leading manufacturers of the United States; the collection of working drawings consisting of over three hundred blue prints, and the sample collection of models, machine parts, valves, electrical fittings, insulating materials, abrasives, etc.

The mechanical and electrical laboratory, which occupies a large room adjoining the Pump House, is equipped for the study and operation of boilers, steam and gasoline engines, hydraulic and electrical machinery. Besides the machinery of the shop and mill which can be used for experimental purposes and for study of machine design, the University has a 45 h. p. tubular boiler, 35 h. p. Atlas engine, 30 h. p. Scott engine, a 10x7x10 Worthington Duplex pump, a Duplex feed pump, a Cameron pump, a 3 h. p. and a 1-2 h. p. direct current electric motor, an injector, a 500 gallon fire pump, a 40 h. p. Fairbanks-Morse gasoline engine, a 23 k. w. direct current Crocker-Wheeler generator, electrical measuring instruments, and a steam guage tester. A 300 gallon two-stage centrifugal pump in the University well and its electric motor serve as part of the equipment for mechanical engineering.

MECHANICAL ARTS.

The Mechanic Arts building, provided largely

through the generosity of the Copper Queen Consolidated Mining Company, has a total floor area of 7,900 square feet divided as follows: Power room and draughting room, each 1,200 square feet; wood-working shop, forge shop and machine shop, each 1,400 square feet; wash room, 600; model room, 400, and store room 300 square feet.

The entire building is well ventilated and lighted, from above as well as from the sides. The drafting room is heated by steam.

The wood shop is equipped with a full assortment of hand tools, six turning lathes, a Universal wood-working machine, a Whitney dimension sawing machine, a band saw, a Universal trimmer and a large grindstone with truing device.

The forge room contains twenty-four down-draught forges, twenty-four anvils, a combination shear and punch, a blacksmith's drill press and a full assortment of small tools and appliances. Blast is furnished by a No. 3 Sturtevant blower; the smoke and gases are removed by a 70-inch exhaust fan.

The machine shop contains one 24-inch Lodge and Shipley engine lathe with taper attachment, two 14-inch Lodge and Shipley lathes, one 14-inch Pratt and Whitney lathe with taper attachment, one 10-inch Reed speed lathe, one 16-inch Cincinnati shaper, one 24-inch by 6-foot Woodward and Powell planer, one Brown and Sharpe No. 2 Universal milling machine, one Brown and Sharpe No. 1 Universal grinder, one

24-inch Prentice Bros. drill press, one power hack saw, one drill grinder, one emery stand and one grinding attachment for the lathes. A 1 1-2 ton portable crane and a 1-ton triplex chain hoist are used in handling the heavier work.

Each shop has its own tool room well arranged and supplied with small tools, gauges, measuring instruments, etc.

A large wash room, containing a hundred lockers, is supplied with basins and running water.

AGRICULTURE AND HORTICULTURE.

The equipment for agricultural instruction is good. The University leases a tract of twenty-three acres of cultivated land in the Santa Cruz valley near the city, for purposes of instruction and demonstration. It has also laboratory equipment consisting of an excellent seed collection, a green house and gardens for experimentation, and a well-selected agricultural library.

In addition to regular courses of instruction in agriculture and horticulture. "Timely Hints for Farmers," issued under the auspices of the Experiment Station, are of distinct educational value. Three thousand farmers of the Territory are reached more or less regularly by timely publications on subjects of vital interest. Farmers' Institutes, announcements of which are made from time to time, take the form of short courses in agriculture.

Small and well selected agricultural libraries of slight cost have been forwarded to a considerable num-

ber who have expressed a willingness to receive them.

GYMNASIUM.

Herring Hall, the gymnasium, is fully equipped for the purposes of the department of physical training and athletics. The apparatus is of standard make, and includes forty chestweights, dumb-bells, bar-bells, wands, Indian clubs, Medart vaulting horse, parallel bars, horizontal bar, quarter-circle, abdominal chair, wrestling machine, wrist machine, finger machine, chest expander, chest developer, climbing rope, flying rings, traveling rings, striking bag and drum, jump and vaulting stands, fencing foils and masks, basket balls and goals, five large mats and a set of anthropometric apparatus.

In the basement are located ninety-six lockers, and five shower baths which are supplied with hot water from a heater with large reservoir.

In connection with this equipment are the base ball and football fields, and four fine tennis courts.

A gallery built across the west end of the gymnasium, with a seating capacity of about one hundred and fifty, much increases the convenience and usefulness of this building.

MILITARY.

Room O is used as an armory. It is fitted up with the necessary gun racks and accessories. The equipment includes 150 old style Springfield rifles, 100 new Springfield rifles with complete accoutrements,

eight sabres and belts, musical instruments for the band, and signal flags. A large clear area south of the Library building is kept leveled and smooth for a drill ground and parade ground. At the rear of the Mill building are the targets for short range practice.

GENERAL INFORMATION

COLLEGE OF AGRICULTURE AND MECHANIC ARTS.

The courses offered in the College of Agriculture and the Mechanic Arts provide both a liberal training along literary and scientific lines and technical training along engineering, mechanical and agricultural lines. Great latitude of election is given in the literary and scientific courses, but the courses in engineering are more rigid in their requirements. Full details of the various courses follow. The aim in all is to combine the practical with the theoretical instruction. The needs of a young and growing commonwealth are kept in mind, and a steady attempt is made to develop the adaptability and resourcefulness so necessary to meet changing conditions.

ARIZONA SCHOOL OF MINES.

The School of Mines is designed for the education and training of young men in the arts and sciences directly involved in the industries of mining and metallurgy. Especial attention is given to the sciences of mathematics, physics, chemistry, mineralogy, geology and their applications. The Bureau of Mines and Assaying, while not directly connected with the work of instruction, affords with its laboratory and the influx of new material, a valuable object lesson to the advanced students of mining and metallurgy.

REGISTRATION.

All students are expected to register on registration day at the beginning of the year and at the beginning of the second semester, in the University office or in such rooms as may be designated on that day. Before making choice of elective subjects the student should in every case confer with the instructors concerned and with the committee on registration. A matriculation fee of \$5.00 is required of all students upon entering the University. No student will be considered registered until the matriculation fee has been paid. This fee is paid once and is not required for future registration. After registration no change in classes can be made without the consent of the committee on registration.

Students entering from other institutions should present to the committee certified copies of their records in such schools, together with certificates of graduation or of honorable dismissal. A copy of the school catalogue or course of study should be furnished with the credentials, in order to facilitate the work of the committee.

TUITION.

Tuition is free to students of Arizona. For all non-resident students, tuition is \$10 for each semester. No reduction will be made for late registration or early withdrawal.

RECORDS.

The class standing of each student is determined by the instructor in charge. The method of ascertaining

the student's record is left to the instructor, and his report in all cases is final.

DISCIPLINE.

The disciplinary policy of the University in all its departments is based upon the assumption that the students are young gentlemen and young ladies who come to the institution with a high determination to utilize fully the opportunities offered, and with a keen sense of duty, honor and courtesy to each other and to the faculty. Formal and explicit prohibitions and rules are few, but those will be rigidly enforced, with adequate penalties, and good order and discipline will be maintained. The University is a civil, rather than a military community, and such privileges as will not be abused will be allowed all classes of students. In aggravated cases, such as cheating in University work, frequenting saloons, and other objectionable places, and serious breaches of peace or order, the faculty will not hesitate to proceed to the extreme measure of expulsion. In case of expulsion the student is required by regulations of the Regents and faculty to leave the campus immediately, and by Territorial statute to surrender his cadet uniform to the University. In all matters of discipline the faculty and President will strive for fairness, equity and efficacy rather than uniformity.

Students or classes desiring to make requests of the faculty should file their petition in the President's office before the hour of faculty meeting; class peti-

tions must be presented at least two days before the time of meeting.

VACATIONS AND HOLIDAYS.

A short recess (See calendar, page 2) is taken at Christmas time. The long summer vacation begins about June first and continues until the middle of September. The Thanksgiving recess extends from the close of the regular exercises on the Wednesday before Thanksgiving to the next Monday morning. During the spring, the cadet companies make a practice march of from three to seven days, which constitutes in reality a third vacation for the preparatory department and for freshmen. All legal holidays are observed by the cessation of ordinary University work.

Arbor day has been formally adopted by the University Regents as the regular anniversary on which to celebrate the founding of the institution, in connection with the ceremonies of tree planting.

LIVING ACCOMMODATIONS.

Provision is made so far as possible for furnishing board and rooms to students of both sexes upon the University grounds. Young men have comfortable quarters in South Hall, which can accommodate about seventy-five students, two in a room, and in North Hall (for college men only), which can accommodate thirty-five students. West College, the home of the young ladies, is in charge of an experienced and capable preceptress who has constant supervision of those rooming there. *No students known to have tuberculosis will be admitted to the dormitories or dining hall.*

All dormitories are lighted by electricity. Rooms contain a clothes press, and are provided with single bedsteads, table, chairs, mirror, wash-bowl, pitcher and slop-jar. Students will supply their own mattresses, pillows, sheets, blankets, towels, rugs and brooms, and such other articles as they may desire for ornamenting their rooms. They will care for their own rooms under the direction of the head of the dormitory. The Dining Hall of the University has accommodations for one hundred students. It is under the management of a paid steward who is responsible to the President and the Board of Regents. While the charge for board is very low, it is the aim of the management to serve substantial, wholesome, appetizing meals. All students having rooms in the dormitories are required to take their meals at the Dining Hall. Students and members of the faculty, who reside outside the dormitories, may board at the Dining Hall.

FEES AND EXPENSES.

	Lowest.	Highest.
Tuition free to students from Arizona		
Tuition, students non-resident in Arizona, each semester	\$10.00	\$10.00
Maintenance fee (deposit) by students in men's dormitory	3.00	3.00
Maintenance fee (deposit) by male students residing in town	1.00	1.00
Mining excursions for advanced students	20.00	40.00

Laboratory and shop fees, varying according to courses, per annum ..	2.00	30.00
Military uniforms	16.25	24.00
Books, per annum	5.00	20.00
Board, per month	17.00	20.00
Lights per room, per month50	1.50
Napkins50	.50

By resolution of the Board of Regents of the University, board is to be paid in advance on the twelfth of each month. If tickets for the Dining Hall are not purchased before the twelfth of each month, \$18.00 instead of \$17.00 will be charged for the month's board. Checks and postoffice or express money orders should be made payable to the President. No reduction in the bill for board will be made for a period less than one week, except by special arrangement at the office.

Text-books may be obtained directly from the publishers through a book association managed on the co-operative plan under the direction of the faculty. Members of the cadet companies will be required to provide themselves with the prescribed uniform, which will be ordered by the University. The cost of the cadet gray, woolen uniform, which must be deposited in advance, averages about \$16.25. The uniform has shown better wearing qualities than a civilian suit of equal cost, and parents are urged to consider the matter of uniform when supplying their sons with clothing for the approaching University year. It may be worn on all occasions, and thus will remove

the necessity for additional expenditure for outer clothing other than overcoats. When the warm weather of spring comes, the students are expected to purchase the regulation khaki uniform and campaign hat, the total expense being about \$7.

The University has at present no loan funds with which to aid students who must earn their way. Various positions about the grounds, buildings and laboratories of the University, paying from \$4 to \$20 per month, are filled by students who must be self-supporting. The number, however, is not large, and preference is given to students from Arizona and to those who have spent time enough in the University to demonstrate that they are earnest, capable, reliable young men, likely to do this outside work and at the same time maintain a good record as students.

The Philo Sherman Bennett scholarship was constituted by the gift of \$500 to the University in 1905, through the agency of Mrs. William Jennings Bryan, to be used in aiding young women to secure an education. The income will be awarded to a deserving applicant in the year 1908-9.

REQUIREMENTS FOR ADMISSION.

Applicants for admission to any department of the University will be required to furnish satisfactory evidence of good moral character, and certificate of graduation or of honorable dismissal from the schools with which they were last connected.

For admission to the Freshman class, applicants must be at least sixteen years of age and must satisfy

requirements in subjects sufficient to give sixteen credits as described below. A credit is understood to be the equivalent of one study pursued satisfactorily at least four times a week for one year, as ordinarily taught in high schools.

Students coming from approved high schools, and presenting a detailed official statement of work completed from the principals of such schools, will be excused by the committee on registration from entrance examinations in those subjects covered by the credentials, with the exception of English composition. Other students will be required to pass the entrance examinations.

For admission to the course leading to the degree of Bachelor of Philosophy, the subjects and credits assigned each are:

English	4	Latin	3
Mathematics	2	Greek, French, German	
History and Civics ...	2	or Spanish	2
Science	1	Elective	2

For admission to the course leading to the degree of Bachelor of Science, including the degrees of Bachelor of Science in Mining Engineering, Civil Engineering, Mechanical Engineering, or Metallurgy, the subjects and credits assigned each are:

English	4	Spanish	2
Mathematics	4	Science (Physics re-	
History and Civics ...	2	quired)	3
French, German or		Elective	1

The scope of work required in these various subjects is as follows:

ENGLISH—(a) English classics. An acquaintance with the works named below. These works are divided into two classes, those intended for thorough study and those intended for general reading. The portion of the examination devoted to the former class will be upon subject matter, form and structure. In addition, the candidate may be required to answer questions involving the essentials of English Grammar, and the leading facts in those periods of English literary history to which the prescribed books belong. In the portion of the examination devoted to the latter class, the candidate will be required to present evidence of a general knowledge of the subject matter, and to answer simple questions on the lives of the authors. The form of examination will usually be the writing of a paragraph or two on each of several topics, to be chosen by the candidate from a considerable number—perhaps ten or fifteen—set before him in the examination paper. The treatment of these topics is designed to test the candidate's power of clear and accurate expression, and will call for only a general knowledge of the substance of the books. In preparation for this part of the requirement, it is important that the candidate shall have been instructed in the principles of writing English. A knowledge of grammar is presupposed.

(b) English composition. This requirement can be met only by examination of the candidate or by his

presenting satisfactory composition books of themes certified by a former teacher as original uncorrected work. The examination will take the form of a theme of five hundred words on some subject familiar to the candidate and will be a practical test of his ability to express himself in writing clearly and consecutively. No candidate will be accepted whose work is notably defective in point of neatness, spelling, punctuation, idiom, or division into paragraphs. Those found lacking in composition will be required to make good the deficiency at once in a special class organized for that purpose.

No student will be admitted without examination, except on the certificate from his former instructors that the entire requirement has been fulfilled. Substantial equivalents, properly certified, will be accepted.

For the thorough study: For 1909, Shakespeare's *Macbeth*; Milton's *L'Allegro*, *Il Penseroso*, *Comus*, *Lycidas*; Burke's *Speech on Conciliation with America* or Macaulay's *Life of Johnson*, or Washington's *Farewell Address* and Webster's *First Bunker Hill Oration*, or Carlyle's *Essay on Burns*.

For general reading and practice, selections will be made, at the discretion of the teacher from groups I-VI of College Entrance Requirements in English for 1909-II.

MATHEMATICS—Arithmetic as covered in White's *Advanced Arithmetic* to the appendix, but these subjects will be omitted in the entrance examinations; lon-

gitude and time, present worth, stock investments, exchange, equation of payments, compound proportion, partnership and cube root. Algebra, through quadratic equations, as given in Wells' *Essentials of Algebra* or Wentworth's *New School Algebra*. Plane geometry as treated in the latest editions of Wentworth or Wells. For students in the scientific or engineering courses, solid geometry and trigonometry, each requiring a half-year of work, will be required.

HISTORY AND CIVICS—As much as is included in Adams's *European History*; Hinsdale's *American Government*, or Hart's *Actual Government*, together with Channing's *Student's History of the United States*, or Montgomery's *Student's American History*, or text books covering equivalent ground. To meet these requirements a large amount of reference work is expected. In place of general history the following will be accepted: History of Greece and Rome as contained in Myers' histories of Greece and Rome, or an equivalent; and Coman and Kendall's or Larned's *History of England*.

*GREEK—As covered by Gleason and Atherton's *Beginners' Greek Book*; Xenophon's *Anabasis*, four books; Homer's *Iliad*, three books, with composition and the use of Hadley and Allen's, or Goodwin's *Greek Grammar*.

*LATIN—As covered by Collar's *First Latin Book*

*If any language is offered it must be to the extent of two credits, since a single year's study of a language is not considered of sufficient educational value to be entitled to credit.

and *Viri Romae*, together with Allen and Greenough's *Grammar* and texts; sight reading; Cæsar, four books, or an equivalent; Cicero, four orations; Virgil, six books; sight reading from Nepos, Cicero and Gellius; Daniell's or Bennett's *Prose Composition*.

*GERMAN—As covered by Thomas' *German Grammar*, with readings outlined for German 1, 2, 3, 4, or an equivalent.

*SPANISH—As covered by Hills and Ford's *Spanish Grammar* with readings, etc., outlined for Spanish 1, 2, 3, 4, or an equivalent.

*FRENCH—As covered by Fraser and Squair's *French Grammar* (Parts I and II) with readings, etc., outlined for French 1, 2, 3, 4, or an equivalent.

SCIENCE—Under this head may be offered the required number of credits in the following subjects: physical geography, physiology, botany, chemistry, physics or elementary astronomy. At least half the preparation in science should consist of laboratory work. Note-books, containing such laboratory work as has been performed by the student, should be presented for examination.

ELECTIVE—The remaining credits required may be made up from additional subjects ordinarily taught in high schools.

Students from other institutions of equivalent rank may be admitted to classes higher than freshmen upon

*If any language is offered it must be to the extent of two credits, since a single year's study of a language is not considered of sufficient educational value to be entitled to credit.

presentation of properly authenticated certificates showing to the satisfaction of the faculty that they are qualified to proceed with their required work. These certificates must be accompanied by statements of honorable dismissal, or leave of absence.

By arrangements with the Arizona Normal School at Tempe, and the Northern Normal School at Flagstaff, students from these institutions will be received into the University without examination, and given credit for all work which is the equivalent of courses offered by the University either for admission or for a degree. Students from this University may also obtain the equivalent privilege at the Normal Schools by presenting the proper certificate of standing, signed by the president.

The faculty desires to establish such relations with high schools and other educational institutions as will enable it to accept their certificates without question. To this end presiding officers are respectively requested to correspond with the President.

COURSES OF STUDY AND DEGREES

All facilities and privileges of the University are open to qualified persons of both sexes.

The University offers four-years courses of study leading to the degrees of Bachelor of Philosophy and Bachelor of Science, and to those degrees specialized as shown on pages 51-52. In each course the work is partly required and partly elective, as described by schedules later. Each student doing full work is required to take not less than sixteen hours of class room work per week. In laboratory work a period from two to three hours is considered the equivalent of one recitation hour.

Persons of mature age and with sufficient preparation, who are not candidates for degrees, may be admitted to regular classes as special students, provided, however, that in all such cases they show to the satisfaction of the instructors in charge that they can take the course with profit to themselves and without detriment to the regular class. It is expected that those who desire thus to specialize in mineralogy, assaying, geology or surveying, will have had at least a high school education, or its equivalent, particularly in English, algebra, geometry, physics and chemistry.

The faculty reserves the right to omit classes in any course of instruction unless a suitable number of students register for the course.

Students who have completed satisfactorily the required work, and the specified amount of elective work, as shown in the accompanying schedules, will be given the degree of Bachelor of Philosophy or Bachelor of Science. The special character of any course of study may be indicated by adding to the degree the name of the department, as: Bachelor of Science in Mining Engineering, or Bachelor of Science in Metallurgy.

Military science and tactics or, for women, physical culture, is required during the Freshman and Sophomore years. If for any reason a student is excused from these exercises, an additional subject having a minimum of three recitation hours per week will be required.

Credit toward degrees is given by means of a unit system which assigns to each course of instruction offered a certain number of units of credit. A unit ordinarily represents one class-room hour per week, or its equivalent of two or three laboratory hours, for one semester. One hundred and twenty-eight units besides six units in military science and tactics and physical culture, are required for obtaining a degree in any course.

Any candidate for a degree may present as part fulfillment of requirements for graduation an acceptable thesis embodying the result of a special study of some subject within the range of the course pursued. The subject of the thesis must be submitted for the approval of the faculty at the opening of the Senior year, and the completed thesis must be presented not later

than three weeks before commencement day. The credit value will be determined by the faculty at the time the subject is approved.

GROUPS OF COURSES.

General—English, Mathematics.

Group A.—Latin, Greek, French, German, Spanish.

Group B.—History, Economics, Philosophy, Sociology, Domestic Science.

Group C.—Astronomy, Botany, Chemistry, Geology, Mineralogy, Physics, Zoology.

Group D.—Civil Engineering, Mechanics Arts, Mechanical Engineering, Metallurgy, Mining Engineering.

The units necessary for the different degrees are as follows:

BACHELOR OF PHILOSOPHY.

a Required—English, 24; Philosophy, 15; History and Economics, 8.

b Group Electives—From Group A, 32; Group C, 16.

c Free electives—33.

BACHELOR OF SCIENCE.

a Required—English, 8; Mathematics, 16.

b Group Electives—From Group B, 4; Group C and D, 56.

c Free electives—44.

For the degrees of Bachelor of Science in Mining Engineering, Metallurgy and Civil Engineering, the same work is required in all for the first two years, as shown on the following pages.

MINING ENGINEERING, METALLURGY, CIVIL ENGINEERING.

First Year.	Second year.
English, 1, 2, 6 units	Mathematics, 3, 4 6 units
Mathematics, 1, 2 10 "	Physics, 1, 2 8 "
Chemistry, 1, 2 8 "	Chemistry, 3, 4 8 "
Mech. Arts, 1, 2,	Mech. Arts, 5, 6 4 "
3, 4 8 "	Civil Eng., 1, 2 8 "
—	—
32 "	34 "

MINING ENGINEERING.

Third year.	Fourth year.
Mathematics, 5, 6 9 units	Mining Eng., 1, 2, 8 units
Mineralogy, 1, 2 7 "	Geology, 3, 4 6 "
Geology, 1, 2 8 "	Metallurgy (lect.) 3 "
Civil Eng., 5, 6 8 "	Civil Eng., 10 4 "
—	Mineralogy, 3, 4 4 "
32 "	Mech. Eng., 1, 2 6 "
	—
	31 "

METALLURGY.

Third year.	Fourth year.
Mathematics, 5, 6 9 units	Mech. Eng., 1, 2 6 "
Mineralogy, 1, 2 7 "	Metallurgy, 1,
Geology, 1, 2 8 "	3, 4, 5, 6 12 units
Chemistry, 5, 6 8 "	Mining Eng., 1 4 "
—	Civil Eng., 5, 6 8 "
32 "	—
	30 "

CIVIL ENGINEERING.

Third year.		Fourth year.	
Mathematics, 5, 6	9 units	Civil Eng., 7, 8	8 units
Civil Eng., 5, 6	8 "	Civil Eng., 10	4 "
Civil Eng., 4	1 "	Mech. Eng., 1, 2	6 "
Civil Eng., 9	4 "	Elective	12 "
Civil Eng., 12	2 "		—
Mineralogy, 1	4 "		30 "
Physics, 4	4 "		
	—		
	32 "		

MECHANICAL ENGINEERING.

Second year.		Third year.	
Mathematics, 3, 4	6 units	Mathematics, 5, 6	9 units
Physics, 1, 2	8 "	Civil Eng., 5, 6	8 "
Mech. Arts, 5, 6	4 "	Mech. Eng., 1, 2	6 units
Mech. Eng., 3, 4	6 "	Physics, 3, 4	7 "
Civil Eng., 1, 2	8 "	Mech. Arts, 7, 8	4 "
	—		—
	32 "		34 "
Fourth year.			
Mech. Eng., 5, 6	8 units		
Mech. Eng., 7, 8	8 "		
Civil Eng., 10	4 "		
Elective,	10 "		
	—		
	30 "		

COURSES OF INSTRUCTION

Courses having odd numbers are given in the first semester; those having even numbers, in the second semester. The hours mentioned show the number of periods per week. The subjects are arranged alphabetically.

AGRICULTURE.

AGRICULTURE 1. PLANT CULTURE AND ORCHARD MANAGEMENT. Elementary plant physiology taking up the process of seed germination; the function of root, stem, leaves, buds, flowers; the plant as affected by unfavorable environment. Plant propagation. Selection of orchard site; lifting, packing, shipping and transplanting trees and vines, cultivation, pruning, spraying, picking, packing, and marketing fruits. Open to all preparatory students. 3 hours, first semester.

AGRICULTURE 2. POULTRY HUSBANDRY. The general care and management of poultry, production of poultry products for the market, diseases and pests, characteristics of breeds. 2 hours, second semester.

AGRICULTURE 4. HOME AND MARKET GARDENING. Practical and theoretical training in the general principles underlying successful intensive farming and the adaptability of Arizona for this branch of farming. 3 hours, second semester.

AGRICULTURE 3. IRRIGATION ENGINEERING. Meas-

uring and handling of ditch water, pumping plants, steam and gasoline engines, electric motors. 5 hours, first semester.

AGRICULTURE 5. FARM DAIRYING AND FEEDING. Production of sanitary milk on the farm, care of dairy cows, principles of butter making, animal nutrition, feeds and feeding. 3 hours, first semester.

AGRICULTURE 6. FARM MANAGEMENT. The course in farm management will deal with the laying out of ranches or farms with reference to arrangement of ditches, buildings, roadways, pumping plants, application of water—ridge culture, flooding on slopes, on dead levels, cultivation with reference to moisture, alkali, sediments, weeds, latent fertility, control of climatic conditons, management of alkali, crop production, successions and rotations, marketing of farm produce, business aspects of farming, such as shipping associations, markets, transportation, and farm bookkeeping. 3 hours, second semester.

AGRICULTURE 7. TYPES OF STOCK. The conformation of beef and dairy cattle and exercises in using the score card. 2 hours, first semester.

AGRICULTURE 10. VETERINARY SCIENCE. Animal physiology, sanitation, symptoms of common diseases and pests, and their remedies. 2 hours, second semester.

AGRICULTURE 8. SOIL PHYSICS. Origin, composition, and classification of soils; soil moisture and meth-

ods of conserving it, soil temperature and conditions influencing it, soil texture as affecting the supply of heat moisture and plant food, various culture methods in relation to soil texture, and plant food, surface tension capillarity, osmosis and diffusion as affecting soil conditions; root development, mechanical analysis of soils. 3 hours, second semester.

ASTRONOMY.

PROFESSOR DOUGLASS.

The wonderful atmosphere of Southern Arizona is the best in the United States for astronomical observation, because it has a smaller percentage of cloud and a lesser average wind velocity than any other locality where records have been preserved. The dry air and 2400 feet elevation give Tucson such a clear sky that faint stars may be watched till they set behind the distant horizon. The fine weather, day after day, gives opportunity for a consecutiveness of observation not obtainable elsewhere. A greater portion of the year is available, with less interference from air currents. This certainty of having clear weather at any given time is of the utmost importance.

The course in Astronomy is arranged especially to draw attention to these advantages, and, at the same time, to give that understanding of the motions of the earth and planets which is so important in many branches of engineering. The four and one-fourth inch Brashear telescope of the University will always be available for closer study of the heavenly bodies. An

excellent clock with electric connections for transmitting time gives opportunity for longitude, latitude and time observations. It is hoped in the coming year to install other instruments that will take advantage of the exceptionally favorable conditions so peculiar to Arizona.

ASTRONOMY 1, 2. DESCRIPTIVE ASTRONOMY—The study of the sun, moon and planets and other celestial objects, with constant views of their telescopic appearance and discussion of the latest theories of the evolution of the universe and the condition of the planets. This course will include some research work for which the admirable climate affords opportunity. Open to all students, 3 hrs., or an equivalent, both semesters. 6 units.

BIOLOGY.

PROFESSOR THORNBÉR, MISS TILLMAN.

The courses which follow are calculated to articulate with the work done in biology in the average western high school.

The Desert Botanical Laboratory of the Carnegie Institution of Washington, D. C., is located in the mountains just west of Tucson. In this laboratory, the southwest with its unique and, as yet, little investigated flora, gains what is destined to be one of the important centers of active, scientific research. The research facilities of the laboratory are all that could be desired, and the investigations upon the desert flora will appeal to students of botany from all quarters. In the light of the above, the importance of the Desert Bo-

tanical Laboratory to the University of Arizona and especially to this department will be apparent.

BOTANY 1, 2, GENERAL BOTANY—Botany 1 treats of histology and morphology, and Botany 2 of elementary physiology of plants. Bergen and Davis, *Principles of Botany*, is used as a text-book. Open to all students, 4 hrs. or an equivalent both semesters. 8 units.

BOTANY 3, 4. PLANT GEOGRAPHY. Discussion of factors governing plant distribution. Study of habitat and taxonomic groups of the native flora. Opportunity is offered for advanced work. Open to all students having an equivalent of Botany 1, 2. 4 hrs. both semesters. 8 units.

ZOOLOGY 1, 2. GENERAL ZOOLOGY. A comparative study of the representative invertebrate types is made. Parker and Haswell, *Manual of Zoology*, is used as a text-book. Dodge's, *Elementary Practical Biology* is used in the laboratory. Open to all students, 4 hrs. or an equivalent both semesters. 8 units.

CHEMISTRY.

PROFESSOR GUILD (ABSENT ON LEAVE, 1908-9) ASSIST-
ANT PROFESSOR BENNER.

The instruction in chemistry has two main objects in view; first, to promote general culture; and secondly, to introduce students to technical work, especially in mining. The first two years' work in general chemistry, qualitative and quantitative analysis, places the student in a position to take up advantageously the

study of mining, agricultural chemistry or metallurgy.

CHEMISTRY 1, 2. Lectures and recitations illustrating the chemical properties of the elements and their compounds. Text-books, Newth, *Inorganic Chemistry*, Elliot and Storer, *Qualitative Analysis* and various reference books. Open to all students who have taken courses amounting to one year each in preparatory chemistry and physics. 4 hrs., or an equivalent, both semesters. 8 units. Professor Guild and Assistant Professor Benner.

CHEMISTRY 3. QUANTITATIVE ANALYSIS—Laboratory practice with lectures and recitations; the work will be chiefly in gravimetric methods of analysis. Open to students who have taken Chemistry 2. 4 hrs., or an equivalent, first semester. 4 units. Assistant Professor Benner.

CHEMISTRY 4. VOLUMETRIC ANALYSIS—A continuation of the work in Chemistry 3, special attention being given to the methods of assaying employed in the West. 4 hrs., or an equivalent, second semester. 2 units, if discontinued March 15th; otherwise, 4 units. Assistant Professor Benner.

CHEMISTRY 5, 6. SPECIAL QUANTITATIVE ANALYSIS—The analysis of water, gases, oils, minerals. Open to students who have taken Chemistry 4. 4 hrs., or an equivalent, both semesters. 8 units. Professor Guild.

*CHEMISTRY 7, 8. ORGANIC CHEMISTRY—Lectures on the carbon compounds; laboratory work in organic

analysis and the preparation of organic compounds; vapor density and molecular weight determination. Open to students who have taken chemistry 3, 4. 4 hrs., or an equivalent, both semesters. 8 units.

CHEMISTRY 9. SYNTHETIC CHEMISTRY—The preparation of pure chemical compounds from the crude mineral products. Open to students who have taken Chemistry 4. 2 hrs., or an equivalent, first semester. 2 units.

*CHEMISTRY 10. PHYSICAL CHEMISTRY—Lectures, Historical introduction leading up to a discussion of modern chemical theories. Open to students who have taken Chemistry 3. 2 hrs., second semester. 2 units.

*CHEMISTRY 11, 12. CHEMISTRY OF THE RARE ELEMENTS—The analysis and synthesis of uranium, molybdenum, tungsten, vanadium and cerium compounds. Open to students who have taken Chemistry 6 and 9. 4 hrs., or an equivalent, both semesters. 8 units.

CIVIL ENGINEERING.

PROFESSOR WATERBURY, MR. KELTON.

The courses in this department have been arranged with special reference to the engineering development of the Southwest. Stress will be laid on surveying, railroad and bridge work, and irrigation engineering. The design throughout the courses is to give the student a thorough and practical knowledge of the essential principles of his profession, and to teach the tech-

nical practice of the times so far as possible without sacrificing in other directions.

CIVIL ENGINEERING 1, 2 SURVEYING—Use and care of surveying instruments, United States system of land surveys; city surveys; topographical and hydrographical surveying; mine surveying; and earthwork computations. One full half-day each week is devoted to field practice. Lectures, recitations, drawing and fieldwork. Text-book, Johnson, *Surveying*. Open to students who have taken trigonometry. 4 hrs., both semesters and Saturday forenoons. 8 units. Professor Waterbury and Mr. Kelton.

*CIVIL ENGINEERING 4.GEODESY—Size and shape of the earth; latitude, longitude and azimuth formulas; base line apparatus; trigonometric leveling. Lectures and field work. Open to students who have taken Civil Eng., 1, 2. 1 hr., second semester. 1 unit.

CIVIL ENGINEERING 5. MATERIALS OF CONSTRUCTION—The properties and use of stone, brick, lime, cement, concrete, timber, iron and steel. The computation of stresses in prisms, beams, columns, and shafts, lectures, recitations and laboratory work. Text-book, Merriman, *Mechanics of Materials*. Open to students who have taken or who are taking *Mathematics* 5. 3 recitations and 1 2-hour laboratory period per week, first semester. 4 units. Professor Waterbury.

CIVIL ENGINEERING 6. MASONRY CONSTRUCTION—Foundations on hand and in water, cofferdams, cribs,

caissons, round and sheet piling, bridge piers and abutments, retaining walls, dams, arches, the theory and practice in reinforced concrete construction. Graphical methods of determining stability. Open to students who have taken Civil Eng., 5. 3 recitations and 1 3-hour laboratory period per week, second semester. 4 units. Professor Waterbury.

*CIVIL ENGINEERING 7, 8. MODERN FRAMED STRUCTURES—Stresses in the various types of bridges under different systems of loading; complete design with drawings for a plate girder bridge, and a steel frame building. Text-book, Merriman and Jacoby, *Roofs and Bridges*. Open to students who have taken Civil Engineering, 5. 2 recitations and 2 3-hour drafting periods per week, both semesters. 8 units.

*CIVIL ENGINEERING 9. RAILROAD ENGINEERING—Preliminary and location surveys; simple and easement curves, turnouts and switches; principles of economic location as based upon cost of construction, operating expenses, alignment, and grades; maintenance-of-way. The fieldwork consists of the surveys for a railroad of sufficient length to secure familiarity with the methods of actual practice. Each student makes a complete set of notes, maps, profiles, calculations and estimates of cost. Open to students who have 4 units.

*CIVIL ENGINEERING 10. HYDRAULICS—Velocity and discharge from orifices, weirs, tubes and pipes; flow

in sewers, ditches, canals and rivers; measurement of water power; water wheels of various types. Text-book, Merriman, *Hydraulics*. 4 hrs., first semester. 4 units.

*CIVIL ENGINEERING 12. PRINCIPLES OF IRRIGATION—A study of the present condition of irrigation development in the United States; irrigation legislation; methods of establishing rights to water; a brief reference to the engineering principles relating to the construction and maintenance of canals and reservoirs and the various means of diverting and measuring water for use in irrigation. Prerequisite Civil Engineering 2. 2 hrs., second semester. 2 units.

DOMESTIC SCIENCE AND ART.

MISS TILLMAN.

The courses in Domestic Science and Art are planned for two classes of students: (1) Girls who wish to acquire a knowledge of the household arts in connection with other studies of the preparatory department. (2) College students who receive college credit for the work.

The course for the preparatory students is of a more practical nature, while the college course pays especial attention to the scientific principles underlying the work and pre-supposes the students to have had chemistry and at least one of the biological sciences.

The entire course has for its object the training of the student in the principles of science as applied to

*Omitted 1907-8.

daily living thus demonstrating the value of science, economics and ethics in the betterment of the home.

*DOMESTIC SCIENCE 1, 2. FOOD ECONOMICS—The classification of food stuffs, nutritive and money values; the application of the principles of pure science to the problems of nutrition, dietary work, preservation and preparation. 2 hrs., or an equivalent, both semesters. 4 units.

*DOMESTIC ART 3. TEXTILES—Lectures on textiles, production, properties, manufacture, etc. Laboratory work in hand sewing, drafting of patterns from simple measurements and plain sewing. 2 hrs., or an equivalent, first semester. 2 units.

*DOMESTIC ART 4. HISTORY OF COSTUME—Lectures on the history of costume; the making of patterns from systems; designs, dressmaking, tailor pressing and construction; practical millinery. 2 hrs., or an equivalent, second semester. 2 units.

ECONOMICS.

MR. F. O. SMITH.

ECONOMICS 1, 2. A study of the general principles and laws of economics based upon Seager, *Introduction to Economics*. Special attention is given to the study and criticism of socialism, and the problem of municipal and government ownership of natural monopolies and public utilities. 3 hrs., both semesters. 6 units.

*ECONOMICS 3, 4. A general study of the history and theory of economics based upon Marshall, *Princi-*

ples of Economics, with lectures and required reading. This course aims to acquaint the students with the different modern theories, and economic plans for reform. 3 hrs., both semesters. 6 units.

ENGLISH.

PROFESSOR NEWSOM, MISS LUTTRELL.

The purpose of the courses outlined below is to give a general knowledge of English literature from the fourteenth century to the present time. Chief stress is placed upon the study of the leading authors of the most important periods, though the history of our literature is also traced from age to age. The course in composition aims to develop accurate thought and clear, vigorous expression.

ENGLISH 1 and 2. COMPOSITION—Prescribed for all freshmen. *First Semester*: Short weekly themes corrected and rewritten. Selected readings from English and American writers of prose, with written and oral reports.

Second Semester: Fortnightly themes illustrating methods of narration, description, exposition and argumentation. Hill, *Beginnings of Rhetoric and Composition*, supplemented by lectures. Selected readings and reports thereon as in the first semester. 3 hrs., both semesters. 6 units. Professor Newsom.

ENGLISH 3, 4. NINETEENTH CENTURY PROSE—Primarily for freshmen. From the publication of the *Lyrical Ballads* to the death of Ruskin (1798-1899.)

This course deals with the following writers: Scott, Coleridge, Lamb, Landor, Austin, Hazlitt, DeQuincey, Carlyle, Macaulay, Newman, Trakeray, Dickens, Eliot, Ruskin, Matthew Arnold. Weekly papers on assigned topics, lectures and discussions. 2 hrs., both semesters. 4 units. Professor Newsom.

*ENGLISH 5, 6. SHAKESPEARE—For juniors and seniors. The following plays are read: *Midsummer Night's Dream*, *Romeo and Juliet*, *Henry V*, *Merchant of Venice*, *As You Like It*, *Twelfth Night*, *Hamlet*, *Othello*, *Lear*, *Macbeth*, *Timon*, *cmpest*. Some attention is given to the development of the Elizabeth drama and to Shakespeare's formative period. At least one play is read from each of the following writers: Lyly, Greene, Peele, Kyd and Marlowe. Lectures and discussions and a thesis of not less than 1500 words. 3 hrs., both semesters. 6 units.

ENGLISH 7, 8. EIGHTEENTH CENTURY LITERATURE—For Sophmores. From the death of Dryden to the publication of the Lyrical Ballads (1700-1798.) This course deals with the following writers: Defoe, Swift, Addison, Steele, Pope, Johnson, Horace Walpole, Burney, Beckford, Goldsmith, Burke. Weekly papers on assigned topics, lectures and discussions. 2 hrs., both semesters. 4 units. Professor Newsom.

*ENGLISH 9, 10. SEVENTEENTH CENTURY LITERATURE—For juniors and seniors. This course deals with Bacon, Milton, Herrick, Donne, Bunyan and Dry-

*Omitted 1907-8.

den. Weekly papers on assigned topics, lectures and discussions, and a thesis of not less than 1500 words. 2 hrs., both semesters. 4 units.

*ENGLISH 11, 12. POETRY—For juniors and seniors. From the publication of Thomson's *Winter* to the death of Tennyson (1726-1892.) This course deals with the following writers: Thomson, Collins, Gray, Blake, Burns, Wordsworth, Coleridge, Scott, Byron, Shelley, Keats, Matthew Arnold, Browning, Tennyson. Weekly papers on assigned topics, lectures and discussions, and a thesis of not less than 1500 words. 2 hrs., both semesters. 4 units.

ENGLISH 13, 14. CHAUCER—For sophomores and juniors. In this course a large part of the *Canterbury Tales* is read, the *Prologue to the Legende of Gode Wommen*, and some of the minor poems. The course is purely literary and a knowledge of Anglo Saxon is not required. 3 hrs., both semesters. 6 units. Miss Lutrell.

FRENCH.

PROFESSOR TURRELL, ASSISTANT PROFESSOR LIGDA.

FRENCH 1, 2. First semester: Fraser and Squair, *French Grammar* (Part II), Aldrich and Foster, *French Reader*. Second Semester: Reading of Daudet, *La Belle Nivernaise*, Labiche and Martin, *La Poudre aux Yeux*, Halevy, *L'Abbe Constantin*. Composition and dictation, with drill on irregular verbs. 5 hrs., both semesters. 8 units. Assistant Professor Ligda.

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FRENCH 3, 4. First Semester: Fraser and Squair, *French Grammar* (Part II.). Merimee, *Colomba* or *Carmen*, Lamartine, *Graziella*, Sand, *La Mare au Diable* or *La Petite Fadette*. Second Semester: Selected reading of DeVigny, *Cinq Mars*, Canfield, *French Lyrics*, Victor Hugo, *Les Misérables*, etc. Conversation drill using Kron, *French Daily Life*. 5 hrs., both semesters. 8 units. Professor Turrell.

*FRENCH 5. THE CLASSICAL FRENCH DRAMATISTS—Reading of plays of Corneille, Racine and Molière. Study of history of French literature to the 19th century. 3 hrs., first semester. 5 units. Professor Turrell.

*FRENCH 6. HISTORY OF FRENCH LITERATURE IN THE 19TH CENTURY. Class reading of recent writers as Daudet, Dumas, Zola, Verlaine, Coppée, Rostand, etc. 3 hrs., second semester. 3 units. Professor Turrell.

GEOLOGY.

The courses in Geology are constructed with special reference to the following: 1st, the development of the observational faculties; 2nd training in inductive and deductive reasoning whereby each student discovers for himself the causes for each phenomenon observed; 3rd. practical application of geological principles to mining with special training in structural geology and mapping.

GEOLOGY 1, 2. GENERAL GEOLOGY—Geological processes, their causes and effects. The atmosphere, surface and underground water, the ocean and the ice

*Omitted 1907-8.

and snow as geological agents. Earth movements; mountain and continent building; vulcanism. Rocks, their origin and alterations. Structural geology (problems through the entire course.) Short review of the physical history of the earth and correlated life progress. Detailed study of ore deposits.

Laboratory work is given in connection with the study of rocks, structural geology and ore deposits. Study in the interpretation of scenery and rock structure aided by the stereopticon. Open to students who have taken or are taking mineralogy 1, 2, 4 hrs. a week both semesters, 8 units.

GEOLOGY 3, 4. TOPOGRAPHICAL AND FIELD GEOLOGY—Construction of maps and sections. United States Geological Survey methods of geological mapping. Geological mine mapping and stereography. Two geological maps are required of each student, one of a portion of the Tucson mountains (composed of lava flows) and one of a district in the Rincon mountains (faulted and folded sedimentary rocks.) Prerequisite Geology 1, 2. All day Saturdays, both semesters. 6 units.

GERMAN.

PROFESSOR TURRELL, MRS. HOCHDERFFER.

GERMAN 1, 2. First Semester: Bacon, *New German Course*, complete. Second semester: Reading of easy texts, such as Andersen, *Bilderbuch ohne Bilder*, Storm, *Immensee*, von Hillern, *Hoher als die Kirche*, Gerstaecker, *Germelhausen*. Composition, dictation and

continued grammar drill. 5 hrs., both semesters. 8 units. Mrs. Hochderffer.

GERMAN 3, 4. First Semester: Thomas, *German Grammar* (Part II.) Reading of Meyer-Foerster, *Karl Heinrich*, Heine, poems and *Die Reisebilder*, Lessing, *Minna von Barnhelm*. Second Semester: *Goethe*, *Hermann and Dorothea*, Schiller, *Wilhelm Tell*, *Maria Stuart*. An outline of the history of German literature will be given during the year. 5 hrs., both semesters. 8 units. Professor Turrell.

GERMAN 5. GERMAN LITERATURE IN THE NINETEENTH CENTURY. The Romanticists and their successors. Class reading of Kleist, *Der Prinz von Homburg*, Grillparzer, *Der Traum ein Leben*, etc. Lectures and library readings. 3 hrs., first semester. 3 units. Professor Turrell.

GERMAN 6. RECENT LITERARY MOVEMENTS IN GERMANY. The rise of nationalism and symbolism. Reading of Wildenbruch, *Harold*, Fulda, *Der Talisman*, Sudermann, *Johannes*, Hauptmann, *Die Versunkene Glocke*. 3 hrs., second semester. 3 units. Professor Turrell.

HISTORY.

PRESIDENT BABCOCK, MR. F. O. SMITH.

In the work in history emphasis is placed on the social and political development, the relation of cause and effect, and the unity of history. The laboratory method is used whenever possible and individual work insisted upon.

HISTORY 1, 2. ENGLISH HISTORY—Gardiner's *Students' History of England* is used as the basis for the work, with much assigned reading and the preparation of reports. Open to all students. 4 hrs., both semesters. 8 units. Mr. F. O. Smith.

*HISTORY 3, 4. AMERICAN COLONIAL HISTORY—A detailed study of the American colonies under Great Britain, and of the United States to the adoption of the Constitution. Lectures, assigned reading and reports. Open to students who have taken History 1, 2. 3 hrs., both semesters. 6 units.

*HISTORY 5, 6. CONSTITUTIONAL HISTORY OF THE UNITED STATES—A detailed study of the formation of the Union and of the political and constitutional history of the United States down to 1856, based on letters and speeches of American statesmen, public documents and special histories. Open to students who have taken History 1, 2. 3 hrs., both semesters. 6 units.

HISTORY 7, 8. GREAT MOVEMENTS IN HISTORY—Lectures, with readings, on the great forces of history and the forms of their manifestation—migrations, religions, political and economic revolutions, etc. 2 hrs. throughout the year. 4 units. President Babcock.

LATIN.

MRS. NEWSOM.

The courses below are open to students who have completed the first three years of Latin in the sub-collegiate department, or an equivalent. Constant, thor-

*Omitted 1907-8.

ough drills are given in technical grammar and prose composition. In reading, the matter is subjected to grammatical, metrical, rhetorical and historical explanation. The study of the text is made the means of mental discipline, of developing the faculties of observation and critical judgment, and of acquiring habits of thoroughness and accuracy.

LATIN 1, 2. Virgil, *Aeneid*, Books V and VI: Livy, Selections, Cicero, *de Senectute*, *de Amicitia*. Exercises in prose composition. 4 hrs., both semesters. 8 units.

LATIN 3, 4. Tacitus, *Germania* and *Agricola*, Selections from Histories; Horace. *Odes*. 3 hrs., both semesters. 6 units.

MATHEMATICS.

PROFESSOR E. M. BLAKE, ASSISTANT PROFESSOR MEDCRAFT.

MATHEMATICS 1. COLLEGE ALGEBRA—Four hours per week. GRAPHICAL METHODS. One two-hour laboratory period per week. First semester, 5 units. Assistant Professor Medcraft.

MATHEMATICS 2. ANALYTICAL GEOMETRY—Four hours per week. GRAPHICAL METHODS. One two-hour period per week. Second semester. 5 units. Assistant Professor Medcraft.

Mathematics 1 and 2 are prescribed for first year students in Mining Engineering, Metallurgy, Civil and Mechanical Engineering.

MATHEMATICS 3. DIFFERENTIAL CALCULUS—Prerequisite, Mathematics 2. 3 hrs. first semester. 3 units. Professor Blake.

MATHEMATICS 4. INTEGRAL CALCULUS—Prerequisite Mathematics 3. 3 hrs. second semester. 3 units. Professor Blake.

Mathematics 3 and 4 are prescribed for second year students in Mining, Civil, and Mechanical Engineering and Metallurgy.

MATHEMATICS 5, 6. ANALYTICAL MECHANICS—Prerequisites, Mathematics 4 and Physics 1, 2. 5 hrs., including one laboratory period, first semester, 4 hrs., second semester 9 units. Professor Blake.

Mathematics 5 and 6 are prescribed for third year students in Mining, Civil and Mechanical Engineering.

NOTE—During 1908-09 Mathematics 4, Integral Calculus, and Mathematics 5, Analytical Mechanics are prescribed for third year students.

MECHANIC ARTS.

PROFESSOR HENLEY, MR. KELTON.

The courses in mechanic arts comprise the elements of shop work and drawing. The work consists of lectures, recitations, drawing, tool and machine work. The courses are designed with special regard for the needs of the students in engineering, an effort being made to familiarize the student with the fundamental shop methods, of value to every engineer, rather than to develop the skill of the mechanic.

MECHANIC ARTS I. MECHANICAL DRAWING—Elements of orthographic projection, making and lettering of working drawings, tracing and blueprinting. Two 3-hour periods a week, first semester. 2 units. Mr. Kelton.

MECHANIC ARTS 2. DESCRIPTIVE GEOMETRY—Church's 17 problems on lines and planes. Two 3-hour periods a week, second semester. 2 units. Mr. Kelton.

MECHANIC ARTS 3. WOOD SHOP—Bench and lathe work, elements of pattern making, use of wood working machinery. Two 3-hour periods a week, first semester. 2 units. Professor Henley.

MECHANIC ARTS 4. FORGE SHOP—Forge work in iron and steel, tempering, case hardening and annealing. 2 three-hour periods a week, second semester. 2 units. Professor Henley.

MECHANIC ARTS 5, 6. MACHINE SHOP—Bench and floor work, drill press, lathe, planer, milling machine, grinder, etc. 2 three-hour periods, both semesters. 4 units. Professor Henley.

*MECHANIC ARTS 7, 8. ADVANCED SHOP WORK—Manufacturing methods, erection of machinery. Open to students who have had Mechanic Arts 1, 3, 4, 5 and 6. Two periods, both semesters. 2 units. Professor Henley.

*MECHANIC ARTS 9, 10. ADVANCED DESCRIPTIVE GEOMETRY—This course is a continuation of Mechanic Arts 1, 2. Church's *Descriptive Geometry*, is the textbook used. The work covers shade, shadow and perspective. Open to all students who have taken Me-

chanic Arts 1, 2. 2 periods or an equivalent, both semesters. 4 units.

MECHANICAL ENGINEERING.

PROFESSOR E. M. BLAKE.

MECHANICAL ENGINEERING 2. DYNAMO-ELECTRIC MACHINERY—Theory underlying the generation, transmission and utilization of electric currents. Descriptions of the more important types of generators and motors. 2 hours and one weekly laboratory period, first semester. 3 units.

MECHANICAL ENGINEERING 2. Dynamo-Electric Machinery—Theory underlying the generation, transmission and utilization of electric currents. Descriptions of the more important types of generators and motors. 2 hours and one weekly laboratory period, second semester. 3 units.

*MECHANICAL ENGINEERING 3, 4. KINEMATICS OF MACHINERY AND ELEMENTARY MACHINE DESIGN. Theory and design of linkages, gears, cams, screws, etc. Three drafting room periods of two hours each per week, both semesters. 6 units.

*MECHANICAL ENGINEERING 5. MACHINE DESIGN—Continuation of Mechanical Engineering 3, 4. Exercises in design particularly directed towards the designing of complete machines. Three drafting room periods of three hours each per week, first semester 4 units.

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*MECHANICAL ENGINEERING 6. MECHANICAL ENGINEERING—Study of power plants and other machinery installations as to arrangement of parts, adaptability to intended work, economy of first cost and operation. Exercises in design of power plants and writing of specifications. As a part of this course, trips will be made to machinery installations in mining districts of Arizona and Sonora, usually one or two weeks in March or April. One lecture and two drafting room periods of three hours each per week, second semester. 4 units.

*MECHANICAL ENGINEERING 7, 8. MECHANICAL LABORATORY—Operation, inspection and testing of boilers, steam and gasoline engines, compressed air machinery, pumps and electric machinery. One lecture and three laboratory periods of three hours each per week throughout the year. 8 units.

METALLURGY.

PROFESSOR GOODRICH.

METALLURGY 1. INTRODUCTION TO METALLURGY—Physical properties of metals, alloys, thermal treatment of metals, thermal measurements, fuel, refractory materials, metallurgical processes, furnaces, thermochemistry, metallurgy of iron and steel. Seniors in Mining Engineering and Metallurgy. Lectures and recitations, 4 hrs., for 1 month, first semester. 1 unit.

METALLURGY 2. FIRE ASSAYING—Fire assay for

*Omitted 1907-8.

gold, silver and lead. Bullion assays. 15 hrs, per week, or an equivalent, during March, April and May. Prerequisite, Chemistry 3 and 4. 2 units.

METALLURGY 3. METALLURGY OF GOLD AND SILVER—Stamp milling, chlorination, cyanidation, pan-amalgamation; Patio, Cazo, Fondon, Krohnke and Tina processes, hyposulphite leaching practice, etc. Lectures and recitations. Prerequisites, Metallurgy 1 and 2. 4 hrs., first semester. To be given after completion of Metallurgy 1. 3 units.

METALLURGY 4. METALLURGY OF LEAD AND COPPER—Sampling, receiving, purchasing, roasting; blast furnace methods, reverberatory furnace methods; pyritic smelting, converting, desilveration of base bullion, electrolytic refining, hydro-metallurgy of copper, etc. Lectures and recitations. Prerequisites, Metallurgy 1, 2 and 3. 4 hrs., second semester. 4 units.

METALLURGY 5 and 6. METALLURGICAL LABORATORY—Concentration, amalgamation, cyanidation, chlorination, hyposulphite lixiviation, etc., tests together with mill work. 2 hrs., or an equivalent, both semesters. Primarily for seniors in the course in Metallurgy. 4 units.

METALLURGY 7. ORE DRESSING—Breaking, crushing, separating, concentrating, sampling; mill processes and management. Lectures and recitations. Prerequisites, Chemistry 3 and 4 and Metallurgy 2. 3 hrs., first semester. 3 units.

METALLURGY 8. Metallurgy of zinc, cadmium,

nickel, mercury, bismuth, tin, antimony, cobalt, platinum, tungsten, molybdenum. Lectures and recitations. Prerequisites, Metallurgy 1, 2 and 3. 2 hrs., second semester. 2 units.

MILITARY SCIENCE AND TACTICS.

LIEUTENANT MC CLURE.

PRACTICAL COURSE—Infantry Drill Regulations, through the school of the battalion in close and extended order. Advance and rear guards, and outposts. Marches. The ceremonies of battalion review, inspection, parades, guard mounting and escort of colors. Infantry target practice. Instruction in first aid to the injured. Required of all able-bodied male students throughout the Freshman and Sophomore years, except that students who have satisfactorily completed four years of drill at the end of Freshman year may be excused from further work in the department. Elective during the remainder of the course. Juniors who elect this course may receive credit to the extent of two units. Three hours, both semesters.

THEORETICAL COURSE—The Infantry Drill Regulations covered by the practical instruction. The Manual of Guard Duty. Small-Arms Firing Regulations, Parts I, II and VII. The Articles of War. One lecture on camps and camp hygiene. Lectures on other military subjects. Required of all commissioned and non-commissioned officers. One hour, both semesters.

Students claiming exemption from drill will be required to secure a certificate of disability from a physi-

cian designated by the faculty, unless the disability is apparent. Those so excused will be required to elect a subject in place of this course. The officers will be appointed from an eligible list determined by examination, both scholarship and class standing being taken into account, according to the principles governing such selection at the United States Military Academy.

Each member of the military organization will be required to provide himself with the regulation uniform upon his entrance. A deposit covering the cost of the uniform should be made upon registration. The uniform consists of cap, coat and trousers of cadet gray cloth trimmed with black braid, and closely resembles the undress uniform of the United States Military Academy at West Point.

MINERALOGY.

PROFESSOR GUILD (ABSENT ON LEAVE, 1908-9,) PROFESSOR TOLMAN (IN CHARGE, 1908-9).

The main object of the course in mineralogy is to familiarize the student with facts and methods that will enable him to determine the character of an ore or mineral by an observation of its physical properties and by the performance of a few simple tests with the blow-pipe. The value of such a course cannot be over-estimated, since these quick methods of analysis are frequently needed in the field and mine when recourse cannot be had to a well-equipped chemical laboratory. The course is of value also to the student of general science, since it adds to the pleasure of a day in the

mountains or field, and is necessary to full appreciation of the study of geology. The course is not only practical, but the theoretical side of the subject receives attention in mineral optics, crystallography and similar topics.

MINERALOGY 1, 2. Lectures and recitations in crystallography and the classification and uses of minerals; laboratory work in blow-pipe analysis and determinative mineralogy; the study of a type collection of 600 minerals arranged and classified according to Dana. Text-books: Dana, *Text-book of Mineralogy*, and Brush, *Manual of Determinative Mineralogy and Blow-Pipe Analysis*. Open to students who have taken Chemistry 2 and Physics 2. Units are distributed as follows: Crystallography, 2; blow-pipe analysis, 2; descriptive mineralogy, 3.

MINERALOGY 3. Advanced crystallography and microscopic study of the rock-forming minerals. Open to students who have taken Geology 2 and Mineralogy 2. 2 hrs., or an equivalent, first semester. 2 units.

MINERALOGY 4. PETROGRAPHY—The preparation of thin sections of rocks for microscopic study, rock analysis, and the study of a type selection of rocks: Text-book; Harker, *Petrology for Students*. Open to students who have taken Mineralogy 3. 2 hrs., or an equivalent, second semester. 2 units.

MINING ENGINEERING.

PROFESSOR TOLMAN.

In this course attention is largely directed to the

economics of mining, and the laboratory work is so arranged that upon the completion of the course the student will have in his notes plans which will be of value in the practice of the profession.

MINING ENGINEERING 1, 2. Ores, their nature and occurrence; locations of claims; mining laws of the important mining countries of the world; prospecting; excavations; tunnels, shafts and methods of timbering; underhand, overhand, square sett, filling and caving methods of mining; pumping; ventilation; transportation; hoisting; installation of machinery and surface improvements.

Methods for undeveloped properties compared with those for developed mines. Mine accounts, cost sheets, stope sheets. assay plans; methods of management, mine sampling and mine reporting. Prerequisites, Mathematics 5, 6, Geology 1, 2. 2 hours and two laboratory periods of 3 hours each, both semesters, 8 units.

MINING ENGINEERING 3. PRACTICAL MINING—Before entering upon the work of the Senior year, all students who are candidates for the degree of B. S. in Mining must have spent at least four weeks in practical underground mining. The fulfillment of this requirement must be evidenced by the certificate of the mine superintendent or foreman, and by notes and sketches of the processes observed, to be presented to the faculty of the School of Mines, and discussed with them.

MINING ENGINEERING 4. MINING EXCURSIONS. In connection with the courses in Mining Engineering.

Metallurgy and Mineralogy, trips will be made to mining districts in Arizona and Sonora, usually one or two weeks in March or April. These trips are required of all candidates for the degree of B. S. in Mining Engineering and metallurgy.

The purpose of these trips is to afford the mining students an opportunity for close study and inspection of mining and metallurgical plans, and of rock formations and of minerals of commercial value. The students are accompanied by two professors, and every effort is made to make the trips of the greatest practical value. The visits are carefully scheduled and notes, with sketches, measurements and photographs are taken, and elaborated into comprehensive reports by each student after the return. These trips are of incalculable assistance to the lecture, text books and draughting room work.

The subjects of special consideration are transportation, both above and below the surface, mine surveying, methods of stoping and timbering, the best treatment for each ore, assaying and furnace charges, smelting practices, concentration of low grade ores, power generation, pumping and water supply, and mill construction.

During April, 1908, the mining district of Silverbell and the metallurgical plant at Sasco were visited in this way. The thanks of the University are due the superintendents of the various plants visited, for their ef-

forts and care in acquainting the students with the works under their management.

MUSIC.

MR. HOOVER.

The department of music was established in September, 1906, with the primary object of furnishing instruction in vocal music, especially in the form of choruses and glee clubs. The work during the year 1907-1908 has consisted of a general chorus open to all students and required of all unexcused preparatory students, meeting twice a week; two glee clubs meeting twice a week (one for men and one for women); and an orchestra meeting twice a week.

Mr. Hoover gave private instruction in both vocal and instrumental work, at the rate of \$20 for a term of ten weeks, two lessons per week. The University is not prepared to furnish full opportunities for regular use of pianos for practice. The pianos in the dormitories may be used to a limited extent, provided the practice does not disturb ordinary study.

MUSIC 1, 2. ELEMENTARY CHORUS WORK, consisting of sight reading, elementary theory, training of the ear, and simple chorus work. Open to all students. Two half-hours throughout the year. 1 unit.

MUSIC 3, 4. ADVANCED CHORUS WORK, consisting of theory, harmony, and the heavier choral works. The class will be expected to form a part of the Annual Festival Chorus with the Tucson Choral Club. Open

to all students sufficiently advanced to undertake the work. 2 hrs., both semesters. 2 units.

MUSIC 5, 6. GLEE CLUBS AND ORCHESTRA. Separate glee clubs will be formed for young men and young women. Open to all students who show the required proficiency as vocalists or with instruments. 2 hrs., both semester. 1 unit.

PHILOSOPHY.

MRS. STANLEY.

PHILOSOPHY 1, 2. HISTORY OF PHILOSOPHY—A study of the basal concepts and fundamental problems of philosophical thought as developed historically. Lectures, recitations and assigned reading. Text-book, Schwegler, *History of Philosophy*. 3 hrs., both semesters. 6 units.

PHILOSOPHY 3. PSYCHOLOGY—A special consideration of the subject as applied to teaching. Lectures, recitations and collateral reading. Open to Juniors and Seniors. 4 hrs., first semester. 4 units. (Given 2 hrs., throughout the year 1907-8.)

*PHILOSOPHY 4. PEDAGOGY—An account of educational evolution, both as a culture fact in the history of civilization and as foundation for professional work; lectures, giving a brief but comprehensive outline of school systems, a special study of leading educators such as Comenius, Pestalozzi, Froebel, Mann and others; methods of teaching, school management and school law. Arrangements have been made with

*Omitted 1907-8.

the Tucson city schools to use the Holliday school as a practice school for this class. Open to students who have taken Philosophy 1. 2 hrs., both semesters. 4 units.

*PHILOSOPHY 5. LOGIC—Text-book, Jevons, *Logic*; reading from Mill, Hamilton, Thompson and others. Open to Juniors and Seniors. 4 hrs., first semester. 4 units.

*PHILOSOPHY 6. ETHICS—Theoretical and practical ethics; view of the historical development of the science; origin and development of the moral consciousness; application of the principles of ethics to the problems of life. Lectures, discussions and assigned reading. Open to Juniors and Seniors. 3 hrs., second semester. 3 units.

PHILOSOPHY 7. PHILOSOPHICAL PROBLEMS IN GREAT BOOKS. A comparative study of interpretations of life as revealed in masterpieces of the world's literature.

This course is designed to meet the needs of students who cannot afford time for advanced English or Philosophy, as well as to supplement the course now offered in those departments. The programme as planned will include ten great books, viz.: *The Antigone of Sophocles*; *the Apology of Socrates*; *Plato's Republic*; *The Book of Job*; *Dante's Divine Comedy*; *Don Quixote*; *Les Miserables*; *Faust*; *Tolstoi's Anna Karenina*; *Ibsen's Peer Gynt*. Lectures and interpreta-

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tive readings. Open as free elective to all juniors and seniors.

PHYSICAL CULTURE.

ASSISTANT PROFESSOR LIDGA.

This department is organized to supply the opportunity for such physical work as experience has shown to be necessary under modern conditions, to counteract the effects of close application to mental work, and to favor the attainment by the student body of a high state of physical efficiency.

It is intended that a thorough physical examination, including an examination of the eye, heart and lungs, shall preface the work of every student in physical culture. This examination will be made as soon as possible after the student enters the University and at intervals during his or her course for safety and for determining the results of the work. Anthropometric cards and charts are platted for the students when desired. In special cases the University reserves the right to require a complete physical examination by a designated physician at the expense of the student.

In addition to the regular class drill a certain part of which consists of training and contests in athletic sports, the University is represented by teams in foot ball, baseball, track and field, tennis, and basket ball. Every facility is provided for track and field athletics. The field on the campus contains gridiron, base ball diamond, tennis and basket ball courts, sprinting paths, jumping and vaulting pits.

The course for women consists of systematic exercise for the harmonious development of the entire body, besides a course for the development of grace of movement and the production of symmetry of physique. Special corrective machinery is supplied for this department, so that even the weakest students may be given proper and healthful exercise. Those pursuing this course are required to provide themselves with a gymnasium suit, consisting of a blouse waist and divided skirt with the regulation gymnasium shoes. The suit requires four yards of double width, 54-in. dark blue serge. The waist has a sailor collar trimmed with white braid. The Butterick pattern may be used or ready-made suits may be had at the gymnasium for \$3.75.

The plan of work for the men is three-fold; general graded class work, corrective work and elective athletic work. The athletic work is taken in combination with the class work in order that the student by this combination may obtain the best possible development. The corrective work is given under special supervision to all those who are in need of special development, and, also, to those who are unable to do the regular class work.

PHYSICS.

PROFESSOR DOUGLASS.

The object of this course is to acquaint the student with the fundamental physical principles which underlie the higher courses of chemistry, mechanics and engi-

neering. Special attention is therefore given to the study of force and energy, the physics of liquids and gases and heat. Owing to the great modern development of electricity, an important part of the course is devoted to this study. Note books are required in all courses.

PHYSICS 1, 2. GENERAL PHYSICS—Lectures recitations and laboratory work. First semester: Mechanics and Heat with corresponding experiments in the laboratory. Second semester: Electricity, Wave Motion, Sound and Light. The laboratory experiments give prominence to general electrical measurement, but include the study of wave motions and their application to the other subjects. Open to students who have taken a course in elementary physics and Mathematics 1. 2 hrs. and 2 two-hour periods in the laboratory, or an equivalent, both semesters. 8 units.

PHYSICS 3. THERMODYNAMICS AND HEAT—A study of the foundation principles underlying mechanical engineering, latent and specific heats, conductivity, expansion, mechanical equivalent, high temperatures, cycles, entropy, properties of steam, etc. Prescribed for third year in mechanical engineering course. Two 2-hour laboratory periods and one hour for lecture or recitation, or an equivalent, first semester. 3 units.

PHYSICS 4. ELECTRICAL AND OPTICAL MEASUREMENTS—A study of the electrical machines and instruments used in mechanical engineering, and of the optical instruments handled in mining and civil engineering

courses. Prescribed for the third year in mechanical and civil engineering courses. Two 3-hour periods, second semester. 4 units.

SOCIOLOGY.

MR. F. O. SMITH.

*SOCIOLOGY 1. ELEMENTS OF SOCIOLOGY—A study of the nature, origin and development of the social forces; a treatment of the phenomena and laws of society as it is, including whatever conduces to or modifies human association. Dealey and Ward, *Text-book of Sociology*, will be used as a guide and supplemented by lectures, collateral reading and reports. Open to Juniors and Seniors. 3 hrs., first semester. 3 units.

*SOCIOLOGY 2. CHARITIES AND CRIME—A consideration of social pathology, including an examination of the origin and nature of the dependent, defective and delinquent classes. A study will be made of the principles and methods of relief; cause of crime, prison systems; juvenile offenders; preventive measures, etc. Guide, Warner, *American Charities*. Prerequisite, Sociology 1. 3 hrs., second semester. 3 units.

SPANISH.

PROFESSOR TURRELL, MRS. HOCHDERFFER.

SPANISH 1, 2. First semester: Hills and Ford, *Spanish Grammar*; Turrell, *Spanish Reader*, begun. Conversation and oral work. Second semester: Grammar and Reader completed; additional readings with

*Omitted 1907-8.

composition work and dictation. 5 hrs., both semesters. 8 units. Mrs. Hochderffer.

SPANISH 3, 4. First semester. Reading of short stories by Escrich, Taboado, Becquer, etc.; Alarcón, *El Capitán Veneno*. Second semester; Galdós, *Marianela*. Second semester; Valdés, *La Alegría del Capitán Ribot*. Two hours each week throughout the year will be given to composition, letter-writing and syntax, using Umphrey, *Spanish Composition* and Bonilla, *Spanish Daily Life*, 5 hrs., both semesters, 8 units. Professor Turrell.

SPANISH 5. Lectures in Spanish on the history of Spanish literature. The classical Spanish drama. Study of the age of Lope de Vega and Calderón. Reading of Lope, *La Estrella de Sevilla*; Calderón, *Le Vida es Sueño*. 3 hrs., first semester. 3 units. Professor Turrell.

SPANISH 6. Recent Spanish literature, with particular study of the modern drama. Reading of Eche-
garay, *O Locura ó Santidad*, and *El Gran Galeoto*, Larra, *Patir á Tiempo*; Nuñez de Arce, *El Haz de Leña*, Galdós, *Electra*, etc. 3 hrs., second semester. 3 units. Professor Turrell.

*SPANISH 7. General survey of the literature of the countries of Spanish America. Class reading of Ugarte, *La Joven Literatura Hispanoamericana*; Hills, *Bar-dos Cubanos*, and various texts. 2 hrs., first semester. 2 units. Professor Turrell.

*To be given 1908-9.

*SPANISH 8. History of Mexican Literature, with reading of works by the best authors, as included in the *Biblioteca de Autores Mexicanos*, etc. 2 hrs., second semester. 2 units. Professor Turrell.

*To be given 1908-9.

SHORT COURSE IN AGRICULTURE

This course is offered: first, to meet the demands of prospective home seekers who desire to learn something about the general principles and practices of irrigation farming before engaging in actual farm operations in Arizona. Second: to give the young man who feels that he cannot afford the time or the means to pursue a full college course a brief introduction to some of the most important scientific principles and facts that are the basis of successful farming, before he settles down to his chosen business, as well as to give him a measure of that broad general culture that is always incidental to university life, and which makes so much for good citizenship. Third: to equip young men to take advantage of opportunities and to fill positions demanding more intelligence and skill than ordinary farm labor. Opportunities and positions for young men of such training are now open in Arizona and will become more frequent as the great reclamation projects being carried on are completed. As specific examples may be mentioned: First, the employment at present by the U. S. Reclamation Service and private ditch companies of many ditch superintendents, all of whom need special training for the work. These positions are constantly changing personnel and the number of such men so employed will more than double within the next two years. The positions pay from \$75 to

\$135 per month. Second, there are vast areas of desert land in Arizona that may be reclaimed by pumping, and the opportunities for development of this kind of irrigation farming have scarcely been touched, but to make the most of such opportunities one will need more mechanical skill and more knowledge of the physical properties of soil than the average farmer possesses. Courses in Irrigation Engineering, Farm Management, Soil Physics, Vegetable Gardening, Orchard Management and Farm Dairying, are especially designed to equip young men to take advantage of these opportunities and positions.

ADMISSION.

Students will be admitted to the short course who have a general knowledge of the common school branches and sufficient maturity in years to understand the value of their time and opportunity. They will be accorded the same privileges, and required to observe the same regulations, as other students registered in the University and resident upon the campus.

EQUIPMENT.

The University is amply equipped with library, laboratory, and green-house facilities, while a leased farm of 23 acres gives opportunity for an abundance of practice in the application of the knowledge gained in class room, library, laboratory, and green house.

The following outline of the course of study indicates the scope of the work done. In addition to the time spent in the class room indicated below, students will

be required to work at least two afternoons per week on the farm for which they will be paid at the rate of 20 cents per hour.

FIRST YEAR.

First Semester.

Irrigation Engineering.	5
Plant Culture and Orchard Management.	3
Drawing and Shop	5
English	5
Botany	3

Second Semester.

Poultry Husbandry	2
Farm Management	3
Home and Market Gardening	3
Drawing and Shop	5
English	5
Botany	3

SECOND YEAR.

First Semester.

English	5
Chemistry	5
Farm Dairying and Feeding	3
Algebra	5
Types of Stock	2

Second Semester.

English	5
Chemistry	5
Soil Physics	3
Algebra	5
Veterinary Science	2

For details of these courses consult the announcements of courses under the heading of Agriculture.

BUREAU OF MINES AND ASSAYING

A separate department of the School of Mines under the name of "The Bureau of Mines and Assaying" has been established to receive and work ores, and to make assays and analysis of ores, minerals, mineral waters and petroleum.

In accordance with the act of the Legislature of the Territory, approved March, 1897, and amended in March, 1899, assays of ores and minerals are made for the prospectors and miners of Arizona and for others at fixed rates established by the law, and tabulated below. To meet the requirements of this work a special laboratory building of brick has been erected and maintained. It is fitted up as a complete assay office and is provided with a large double brick coke-furnace, a melting furnace and gasoline furnaces in a fire-proof room. There are in addition, a parting and wet assay room, a balance room and offices.

Extreme accuracy and excellency of work are considered of more importance than pecuniary profits. All assays are made in duplicate and if not accordant are repeated. A special expert assayer is employed, and the assays are not made by students, who receive their instruction in the regular laboratories of the University.

The money received for assaying is deposited

monthly to the credit of the assay fund, which is used to pay the assayer and the cost of materials and apparatus.

RATES FOR ASSAYING AND CHEMICAL DETERMINATIONS.

COMMON ASSAYS AND CHEMICAL DETERMINATIONS.

One element only.

Gold, or silver, or copper, or lead, or iron, or insoluble	\$1 00
--	--------

Zinc, or calcium, or magnesium, or sulphur or manganese	1 50
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Silicon or chlorine	2 00
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Combinations :

Gold and silver	1 00
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Copper and iron, or lead and iron	1 50
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Insoluble, copper, and lead	2 00
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Insoluble, copper, and iron	2 00
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Insoluble, lead and iron	2 00
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Insoluble, zinc, and iron	2 50
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Insoluble, lead, copper, and iron	2 50
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Gold, silver, copper, and lead	2 50
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Gold, silver, copper, iron, and insoluble	2 50
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SPECIAL CHEMICAL DETERMINATIONS.

One element only :

Aluminum, or tungsten, or barium, or chromium	3 00
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Cadmium, or tin, or arsenic, or bismuth or antimony, or titanium, or sodium, or potassium, or uranium, or phosphorus	4 00
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Nickel, or cobalt, or molybdenum, or vanadium 5 00

CHEMICAL ANALYSIS.

Coal and coke analysis, giving moisture, volatile
combustible matter, fixed carbon and ash 5 00

The same, including determination of sulphur
and phosphorus 7 50

Silicate analysis 15 00

Cement analysis (chemical) 15 00

Cement analysis (mechanical) 2 50

Cement tests (strength and soundness, by the De-
partment of Civil Engineering) 3 00

Boiler water analysis 10 00

RATES FOR TESTING ORES.

Stamp Mill Amalgamation, including sampling, as-
says, retorting, etc.:

For lots of one ton or thereabouts \$30 00

The same, with concentration of pulp on Wil-
fley table 30 00

For lots of two tons, without concentration 40 00

For lots of two tons, with concentration 45 00

Smaller Amalgamation Tests, including all sampling
charges, and concentration after amalgamation:

For small samples up to five pounds \$7 00

For small samples, five to twenty-five pounds 10 00

For small samples, twenty to one hundred
pounds 15 00

In these smaller tests, the sample is ground to pass
a suitable mesh, and is agitated with mercury. The

mercury is panned out, retorted, and the values determined in bullion. The values in the concentrates and tailings are also determined. The number of tests necessary to determine the adaptability of any ore to treatment in cyaniding varies so greatly that no general rates can be offered.

CONSIGNMENTS, REMITTANCES, ETC.

Samples, ores, and other consignments should be shipped to the University of Arizona, the School of Mines, Tucson, Arizona. Small quantities may best be sent by mail, at the rate of one cent per ounce; larger quantities by express or by freight. The Wells-Fargo Express Company makes daily deliveries at the University.

All assays, chemical determinations and chemical analysis, except gratuitous qualitative tests mentioned elsewhere, must be paid for in advance.

No determination of any kind will be made until the required payment arrives. Remittances should be made by post-office money order, Wells-Fargo money order, bank draft, or check on a Tucson bank, payable to K. C. Babcock, President, University of Arizona, to whom also business communications relating to matters discussed in this circular should be addressed.

AGRICULTURAL EXPERIMENT STATION

STAFF.

KENDRIC C. BABCOCK, Ph. D.

President of the University

ROBERT H. FORBES, M. S. - Director and Chemist

JOHN JAMES THORNER, A. M. - - - Botanist

ROBERT W. CLOTHIER, M. S. - - Agriculturist

J. ELIOT COIT, Ph. D. - Associate Horticulturist

ALBERT EARLE VINSON, Ph. D. - Associate Chemist

FREDERICK W. WILSON, B. S. - - - - -

- - - - - Associate Animal Husbandman

WILLIAM B. MCCALLUM, Ph. D. Associate Botanist

WILLIAM H. ROSS, Ph. D. - - Assistant Chemist

T. D. A. COCKRELL, - - Consulting Entomologist

WILBUR O. HAYES, - - - - Secretary

ORGANIZATION AND WORK.

The Agricultural Experiment Station is a legally constituted department of the University, whose purpose is to "aid in acquiring and diffusing * * * useful and practical information on subjects connected with agriculture, and to promote scientific investigation and experiment respecting the principles and applications of agricultural science."

With the above objects in view, the organization of the station includes the departments of administration,

agriculture and horticulture, animal husbandry, botany, and chemistry, the whole or a major portion of the time of one or more members of the station staff being devoted to each department of the station work. Provision is made for meteorological work also, though to a less degree.

Owing to the wide variation in agricultural conditions in Arizona, it has been found of advantage to distribute the work so that each department is located, so far as possible, in that region most favorable to the accomplishment of its own special results. According to this principle, the various lines of Experiment Station work have been distributed as follows:

The Director's office and the departments of botany and chemistry are maintained at Tucson in the University buildings. Through this arrangement the Experiment Station profits by the buildings and libraries of the University, while the University is benefitted from time to time by the teaching ability of members of the Station staff. It has been found that from this base of operations the three great agricultural districts of the Territory—Salt River valley, the lower Colorado and the upper Gila—are accessible with equal convenience for field work and observations.

On the same ground—fitness of location for the work undertaken—the Experiment Station farm has been maintained and strengthened at Phoenix. Salt River Valley is intermediate in elevation, in situation, and in mean yearly temperature between the other two

important farming districts above mentioned, and for this reason the agricultural and horticultural results obtained there are capable of the most general application in the Territory at large.

On the same principle again, the date palm orchard, conducted in co-operation with the United States Department of Agriculture, is located in the alkaline district south of Tempe, where a successful demonstration of this palm as a commercial fruit producer will be of the greatest value, creating use for great areas of alkaline land in the arid southwest. Another orchard has also been planted on a tract near Yuma.

The range station also, for the study of worn-out range country with a view to its reclamation to usefulness, is located in a typical district near Tucson, and is conducted under the auspices of the department of botany, co-operating with the United States Department of Agriculture.

The services of specialists in various subjects, such as entomology, meteorology, and soil survey work, have also been secured from time to time.

The results of the Experiment Station work are made public at frequent intervals in the bulletins and reports of the Station. These publications are made in two series: First, the longer and more technical bulletins, stating in considerable detail the investigations as they mature; and, secondly, the Timely Hints for Farmers, which are brief writings issued at the time when they will be most useful, written in plain language, and pre-

sented in popular form. The annual reports, also, are for the most part written popularly, and afford a convenient and reliable summary of each year's work as it comes to completion.

The Experiment Station work conducted and published on the lines indicated above has a two-fold value. In the first place the suggestions made or derived from the investigations of the Station are of direct material profit to the agricultural public and are intended to be immediately applied to advantage in the betterment of agricultural practice. In the second place, these writings are intended to serve an educational purpose, inasmuch as they are so presented as to constitute lesson sheets for the benefit of the careful reader. It may, therefore, be considered that the Experiment Station reaches a class of some thirty-five hundred readers in the Southwest at frequent intervals by means of its "Timely Hints" and other publications. The operations of the range study tract at Tucson, the Experiment Station farm at Phoenix, and the date palm orchards at Tempe and Yuma serve also as an object lesson to the adjacent public.

It is believed that this distributed and mobile organization is especially effective, not only for the purposes of the Experiment Station, but also for those of the University as well, since it allows the station to conduct its work in localities suitable for the accomplishment of results; and, again, it causes the public to become bet-

ter acquainted with the Territorial University, of which the Station is a department.

Appropriations of \$11,000, made for the use of the Station by the Twenty-second Legislature, and of \$2800 and \$5600 by the two succeeding Legislatures very satisfactorily attest the estimation in which the work of the Station is held. The appropriations were made for the improvement of the date orchards, for purchasing live stock and buildings for the farm; for issuing publications, and for holdings farmers' institutes and short courses of instruction throughout the Territory.

Provision, therefore, is made for the symmetrical development of this work in the Territory, both experimentally and educationally; and, prospectively, "the farmers' college" bids fair to increase in usefulness to the growing agricultural interests of the Territory.

PREPARATORY DEPARTMENT

KENDRIC CHARLES BABCOCK, Ph. D., President,
Civics.

SIDNEY CARLETON NEWSOM, A. M., Acting Principal.

INSTRUCTORS.

CHARLES ALFRED TURRELL, A. M., French, German,
Spanish.

WILLIAM WHEELER HENLEY, A. B., Shopwork and
Drawing.

LIEUT. SAMUEL V. MCCLURE, Military Science and
Tactics.

WILLIAM GEORGE MEDCRAFT, A. M., Mathematics.

ANDREW ELLICOTT DOUGLAS, A. B., Science.

LEVONA PAYNE NEWSON, Ph. D., Latin.

VICTOR LIGDA, B. S., Physical Training and French.

ESTELLE LUTRELL, A. B., English.

RAYMOND C. BENNER, M. S., Chemistry.

FREDERICK E. TALMAGE, B. L., Bookkeeping, Sten-
ography, Typewriting.

OPAL I. TILLMAN, B. S., Domestic Science.

IDA C. REID, Ph. B., Mathematics and History.

MARY J. HOCHDERFFER, A. B., Spanish, German, Eng-
lish.

ESTHER E. LAPE, A. B., English.

F. O. SMITH, M. A., LL.B., History, English.

F. C. KELTON, B. S., Drawing.

GENERAL INFORMATION.

In this department the University offers the work of a well-organized, four-years high school, with the added advantages of shopwork and drawing, domestic science, and military drill. The general library and gymnasium are open to all students in this department.

The equipment of the scientific laboratories is available for use in this preparatory work,, whenever it can be used advantageously, and makes possible strong work in elementary science. The instructors in this department are assisted by the professors of the college departments, several of whom regularly conduct preparatory classes. By reference to the course of study which follows, it will be seen that it offers a comprehensive training for those who may not be able to pursue their studies farther, while it gives a good preparation for college.

ADMISSION.

Admission to regular standing in the first year of the preparatory course presupposes the completion of the work of the eighth grade of the public or parochial schools. Students who do not bring certificates showing the completion of this work, must take examination to test their ability to pursue profitably the work of the first year.

The Board of Regents on April 10, 1906, voted that after September 1, 1906, no pupils who have not completed the work of the ninth grade (or the first year of a high school) should be admitted into the

University from cities in Arizona having more than 5,000 population.

All students entering the preparatory department will be required to take an examination in oral reading. To remedy notable deficiency in this subject, the University will require extra work in addition to other studies.

In all cases in which the preparation of a student in a particular subject proves to be deficient, the University reserves the right to require the student to secure at his own expense the help of an approved coach until the deficiency is remedied.

LIVING ACCOMMODATIONS AND EXPENSES.

One dormitory, South Hall, is set apart for the use of male preparatory students; details of furnishings, living expenses, etc., are set forth in a paragraph earlier in this Register. These expenses are substantially the same for both college and preparatory students, save that laboratory fees and book bills are higher for the former. The expenses necessarily incurred during the academic year are about \$250, but of this amount nearly one-third falls due in the first month, or in the six weeks before November 1st, in the form of charges which are made but once during the year or but once during the stay of the student in the University. The following are the ordinary expenses of the first month:

Matriculation	\$ 5.00
Dormitory deposit—Maintenance fee	3.00
Mattress, blankets, pillows, sheets, etc., (unless brought from home by the student)	15.00
Board for first month, including napkin fee	17.50
Books	6.00
Shop and Drawing fee	5.00
Military uniform	16.25
	<hr/>
	\$67.75

The dormitory is placed in charge of two resident instructors, assisted by a committee of five students. Inspection of rooms is made in the morning and in the evening by the head of the dormitory. The hours from seven to quarter past nine in the evening are observed as study hours except on Fridays and Sundays. Students under twenty-one years of age are required, unless relieved by the president, to obtain permission to leave the Campus, or to leave the dormitory during study hours, except on Sundays from nine to twelve A. M., Wednesdays, four to seven, P. M., and Fridays, four to six P. M. Breaches of the regulations of the dormitory are punished by "extra study"—labor about the buildings or grounds—by confinement to rooms, or by expulsion from the dormitory; for damage to University property, a money penalty is imposed.

COURSE OF STUDY.

The following course of study will be required of all students who fit themselves at the University for

entrance to the Freshman class in 1908. Such variations from it will be made during the next year as will adapt it to the case of students already in the sub-collegiate department who took part of their work under the former requirements.

Military drill is required of all able-bodied male students throughout the course. Physical training is required of all students, unless they are excused by the President upon presenting a certificate from one of the University physicians. The young men have drill three times per week and exercise in the Gymnasium twice. The young women have physical culture three times a week.

The language begun in the second or third year must be pursued for at least two years in order to secure credit towards graduation.

Though the subjects are for convenience grouped by years in the following schedule, the departmental method is followed. In the description of courses, the subjects are arranged by groups or departments in the consecutive order in which they are taken up and students will be required to take them in this order. Aside from this sequence the ability of each student must determine what subjects will be pursued at any given time, due regard to be given to the proper balance of subjects. The wishes of parents will always be given careful consideration in making up the schedule of work for each student, but the final decision in the matter must rest with the committee on registration,

which is composed of persons who have had long experience in secondary and collegiate teaching. Individual attention will be given to the needs of each student.

To each student who completes the studies of this course receiving a total of sixteen units (a unit representing a subject pursued for one year with five, or four, recitation periods per week), a certificate stating that fact will be given.

This certificate will entitle the holder to admittance to the corresponding University courses of instruction without examination.

Subjects thus marked * are elective. Five hours of elective must be chosen in the second year. In the third year and in the fourth year, electives making up at least nine hours must be chosen.

FIRST YEAR.

English	5	Drawing and shop	
Algebra	5	work, or Domestic	
Greek and Roman His-		Science	5
tory	3	English	5
Physical Geography . .	3		

SECOND YEAR.

English	5	*Latin (first year)	5
Algebra	5	*German (first year) . .	5
European History. . . .	5	*French (first year) . .	5
*Botany	5		

*Subjects thus marked are elective. Five hours of elective must be chosen in the second year. In the third year and in the fourth year, electives making up at least nine hours must be chosen.

*Spanish (first year)..5	*Drawing and shop work,
*Bookkeeping (7 hrs).5	or Domestic Science.5

THIRD YEAR.

English5	*French (second year).5
Plane Geometry5	*German (first year)..5
*Chemistry5	*German (second year).5
*Latin (second year)..5	*Spanish (first year)..5
*Greek (first year)...5	*Spanish (second year).5
*French (first year)...5	*Stenography5

FOURTH YEAR.

English5	*Physics5
American History and	*Latin (third year)...4
Civics5	*Greek (second year)..5
*Solid Geometry (first	*French “ “ 5
half)4	*German “ “ 5
*Trigonometry (second	*Spanish “ “ 5
half)5	

ENGLISH.

The English of the preparatory course is based upon what is known as the entrance requirements of New England colleges. The work is in general divided into three parts: Classics, studied in class, composition and grammar work done partly in class and partly outside, and supplementary reading done largely outside the class room. All these parts of the work may be carried on at the same time, as the circumstances of the class

*Subjects thus marked are elective. Five hours of elective must be chosen in the second year. In the third year and in the fourth year, electives making up at least nine hours must be chosen.

seem to require, the classics and supplementary reading forming the basis of a large part of the work in grammar and composition. Throughout the course, however, a primary aim is to develop the student's individual power of expressing himself in words. The time allotted to these three phases of English varies from year to year, increasing attention being paid to the appreciative and critical faculty as the course advances. In the fourth year a brief outline history of English and American literature occupies about one-third of the year's work in English.

Five hours each week throughout the course are given to English. According to the following general outline, selections from the list below are made at the discretion of the teacher, preference being given to the New England College Entrance Requirements, which are marked by an asterisk*.

FIRST YEAR.

ENGLISH GRAMMAR AND COMPOSITION receive one-half of the time of the first year.

CLASSICS. Longfellow's *Tales of a Wayside Inn*; Bryant's *Water Fowl*, *Planting of the Apple Tree*, *Forest Home*, the *Antiquity of Freedom*; Lowell's shorter poems; Tennyson's *Enoch Arden*, Miller's *Daughter*.

SUPPLEMENTARY READING. *Talisman*, *Tom Brown at Rugby*, *Last of the Mohicans*, *The Sketch Book*, *The Man Without a Country*, *The House of Seven Gables*, **Ivanhoe*.

SECOND YEAR.

COMPOSITION AND GRAMMAR. As in the first year with attention to figures of speech, reproducing the work of classic authors, elementary etymology, exercises in exposition, narration and description.

CLASSICS. *The Vision of Sir Launfal, *The Ancient Mariner. The Ballad Book (Bates), Sohrab and Rustum and *The Idylls of the King, studied as in first year.

SUPPLEMENTARY READING. Deserted Village, Lorna Doone, Tale of Two Cities, Life of Goldsmith, Quentin Durward, The Cricket on the Hearth.

THIRD YEAR.

Composition and Rhetoric are continued with emphasis on elementary argumentation and exposition.

CLASSICS. Julius Caesar,, *The Merchant of Venice, The Princess, *Sir Roger de Coverly, Poems of Burns, Carlyle's Essay on Burns. These are for general reading as in the first and second years. For careful reading are the following: *Milton's L'Allegro, Il Penseroso, Comus, Lycidas; *Macaulay's Essay on Milton. Special attention will be given to the author, his times and surroundings, and his style.

SUPPLEMENTARY READING. Sesame and Lilies, Backlog Studies, Treasure Island, Kidnapped, Silas Marner, Alhambra.

FOURTH YEAR.

COMPOSITION AND GRAMMAR. Exercises in narra-

tion and description for flexibility and ease of expression and general preparation for entrance requirement "b" on page 44 of this Register.

CLASSICS. *Burke's Speech on Conciliation; Macaulay's *Life of Johnson, Essay on Addison; *Macbeth The Tempest, Midsummer Night's Dream. These are all for thorough study.

HISTORY OF ENGLISH LITERATURE. From the earliest times, with text-books as guides, with a review in chronological order of the classics studied during the four years of the course, to prepare for examination in entrance requirement "a" on page 44 of this register. Special attention is paid to Keats, Shelley, Tennyson and other representative poets of the nineteenth century.

SUPPLEMENTARY READING. *Vicar of Wakefield, The Making of an American, The Newcomes, Oliver Twist, American Orations and Addresses.

MATHEMATICS.

FIRST YEAR.

ALGEBRA. Introduction, factoring, fractions, simple equations, simultaneous equations, and special problems.

SECOND YEAR.

ALGEBRA. Involution, evolution, theory of exponents, radicals, quadratic equations, and proportion.

After 1907 but two years will be devoted to preparatory algebra. The two years' work will be required for entrance to college.

THIRD YEAR.

Plane geometry, including thorough work in original exercises.

FOURTH YEAR.

First semester, solid geometry with original exercises. Second semester, plane and spherical trigonometry.

MECHANIC ARTS.

This work consists of both drawing and shop work, between which subjects the student's time is about equally divided. The course covers two years and is designed to furnish a thorough elementary knowledge of manual training as taught in the secondary schools of the country.

FIRST YEAR. Drawing—Freehand sketching in perspective and orthographic projection. Reinhart's lettering, free-hand working drawings.

Shop work—"Sloyd," care and use of woodworking tools.

SECOND YEAR. Drawing—Mechanical Drawing and geometrical problems.

Shop work—Forging, joinery, wood-turning.

SCIENCE.

It is the object of the courses in science to initiate the student into the processes and methods used in laboratory work; to teach close observation, careful manipulation and logical deduction; to acquaint the student with the fundamental facts of the various branches of science and to give full practice in the use of good

English in describing various observations and experiments. To insure better results in the notebooks, they will all be passed upon by one of the instructors in English.

BOTANY. A year's work is offered in beginning botany, being largely with living plants. Simple and compound microscopes are provided, and students are required to keep careful notes on laboratory work and experiments. The work is supplemented with lectures and a text-book.

PHYSICAL GEOGRAPHY—This course,, combining the laboratory method with the textbook, aims to give the pupils training in exact observation of familiar phenomena, like distance, weight, pressure of liquids and gases, temperature, winds, clouds and the habits of plants and animals. The natural forces producing erosion, formation of soil, and rocks, the processes of nature as seen in seed germination and plant growth (with demonstrations with the microscope) will be discussed, with frequent experiments and field excursions. The entire country within reach of the University is a great natural laboratory, full of interest and information for all. The course explains these features which become so familiar to everyone residing here.

CHEMISTRY. A year's work with the text and in the laboratory, in such proportions as the instructor decides upon. Each student must keep a note-book in which he describes the process and results of his laboratory work.

PHYSICS. The course aims to show that physics is not something abstract or mysterious, but is the simple explanation of everyday occurrences not usually understood and often unnoticed. It consists of three recitation periods and four laboratory periods per week, carried on along the lines laid down for the senior year in secondary schools. Each student must keep a notebook in which a minimum number of experiments must be written up.

DOMESTIC SCIENCE.

The course in domestic science for young women is arranged to give instruction in the science and art of home economies, and to raise home-making to a higher plane.

SEWING. The making of laboratory uniforms, plain undergarments and dresses, with talks on materials and implements used; use of machines with simple attachments. Three periods per week through the year.

COOKING. Practical work in the preparation of food, with study of the food principles and the effect of heat upon each proper combination in a well-balanced diet. Two periods per week through the year.

HISTORY.

The aim of the work in history is to lead the pupil to see the development of races and nations along political, social and religious lines, and to arouse in him a love for the subject and a habit of broad and discriminating reading.

The work of the first year consists of a survey of the development and characteristics of the Greek and Roman civilizations. A text such as Wolfson, *Essentials of Ancient History*, or West, *Ancient History*, will be supplemented by collateral reading and a note-book.

The work of the second year includes mediaeval and modern history. The aim is to give the students an idea of the essential unity of history and the leading facts in the political development of races and nations. Harding, *Essentials of Mediaeval and Modern History*, is used, supplemented by the reading of references contained therein.

Hart, *Actual Government*, is the text-book in civics. The historical development of the subject is made prominent while practical problems, such as taxation and municipal government, are made the subjects of special investigation and study. The text in history will be Channing, *Student's History of the United States*.

LATIN, GREEK, FRENCH, GERMAN AND SPANISH.

For an outline of the courses in Latin and Greek see page 46, under requirements for admission.

For an outline of the courses in French, Spanish and German see pages 67, 89, 69.

BOOKKEEPING AND COMMERCIAL PRACTICE.

Bookkeeping is taught by the modern budget system. The work is individual and each student may progress as fast as his time and ability permit. The course is thorough in all the details of office practice.

Students are made familiar with different filing cabinets, the filing of letters, the use of card ledgers, the copying and indexing of letters and bills in copy books. The course includes instruction in commercial law, with special emphasis laid on the ordinary forms of commercial paper and the different endorsements. The department is equipped with the latest vertical files, cabinets, letter press and office sundries. All students in bookkeeping are required to take some other branch of mathematics and must show proficiency in English.

STENOGRAPHY AND TYPEWRITING.

A complete course in stenography is offered. The Gallagher-Marsh system, a system which has received the highest endorsement of leading court reporters on the Pacific coast, and which has been adopted by the Boards of Education in the largest cities of California, has recently been adopted. The amount of time allotted for this work has also been increased from five hours to eight hours per week. The object of the course is to train students so that they may become practical stenographers. With this end in view particular stress is laid upon neatness, filing, copying and indexing. This branch of the commercial department is equipped with up-to-date filing cases, office sundries, and six typewriters, four of which are Remingtons, one an Oliver and one the L. C. Smith Visible. Five of the typewriters are new. *Students taking this work are required to have had one year of high school English, and to take English with this course.*

ALUMNI ASSOCIATION

The Alumni Association of the University of Arizona was organized on the second day June, 1897.

The object as expressed in its constitution is: "To promote the interests of the University, to secure unity among its graduates and to foster an attachment to our Alma Mater."

Concerning the last two clauses of this declaration it may be said that the organization is carrying out its meaning in a manner which leaves little, if anything, to be desired. There is no doubt regarding the loyalty of the graduates to the University of Arizona and no question of their unanimous desire for the prosperity of the institution.

The first clause in the above declaration, however, deals with a matter which in a sense admits of more growth than those just mentioned, and the members of the association realize that there is room for further progress in the accomplishment of this purpose.

It will be the aim of the alumni association to create a deeper feeling of interest and pride in the University of Arizona among the people of the Territory.

1895.

*Charles Oma Rouse, B. S.

Mercedes Anna Shibell, B. S., (Mrs. A. J. Gould),
Tucson, Arizona.

Mary Flint Walker, B. S., (Mrs. Pearl Adams), Benson, Arizona.

1897.

Edward Marshall Boggs, C. E., (nunc pro tunc), Chief Engineer Oakland Electric Railways, Oakland, Cal.

Clara Cramond Fish, B. S., (Mrs. F. C. Roberts), Phoenix, Arizona.

George Ojeda Hilzinger, B. S., Teller in Bank, El Paso, Texas.

Mark Walker, B. S., Metallurgist, Los Angeles, California.

1898.

Hattie Ferrin, B. S., (Mrs. Charles Solomon), Safford, Arizona.

Granville Malcolm Gillett, B. S., Draughtsman in Surveyor General's Office, Phoenix, Arizona.

Minnie Watts, B. S., (Mrs. W. B. Smith), Altaville, California.

*John Desha Young, B. S.

1899.

Robert L. Morton, B. S., Assayer, Yuma, Arizona.

1900.

Ida Clarissa Flood, B. S., (Mrs. G. Dodge), Oakland, California.

Samuel Pressly McCrea, B. S., A. B., Principal of High School, Redwood City, California.

*Died April 8, 1899.

Charles Pierce Richmond, B. S., Cyanide Manager,
La Union, Salvador, Central America.

Florence Russell Welles, B. S., (Mrs. Wm. Angus),
Los Angeles, California.

1901.

Rudolph Castaneda, B. S., Surveyor, Tucson, Arizona.

Clara Ferrin, B. S., Teacher, Tuscon, Arizona.

George Millard Parker, B. S., Denver, Colorado.

David Hull Homes, B. S., (nunc pro tunc), Architect, Tucson, Arizona.

1902.

Andrew Gilbert Aiken, A. B., B. S., Surveyor, Canton, New York.

Moses Blumenkranz, B. S., Assistant Superintendent
Shannon Copper Company, Metcalf, Arizona.

Ruth Brown, Ph. B., (Mrs. Wilkins Manning), Tucson, Arizona.

Felix Grundy Haynes, B. S., Casa Grande, Arizona.

Rose Belle Parrott, Ph. B., Teacher, Roseburg, Oregon.

Philip Matthew Reilly, B. S., Mining Superintendent, Cumpas, Sonora, Mexico.

Bertram L. Smith, B. S., Assayer, Silver Bell, Arizona.

Bessie Smith, Ph. B., (Mrs. Earle Davis), Douglas, Arizona.

Walter James Wakefield, Cashier, Tucson, Arizona.

1903.

Advanced Degrees:

LL. D., Hon. William Herring, Tucson, Arizona.

M. A., John William Gorby, B. A., (Marietta), Chicago, Illinois.

M. A., Benjamin Franklin Stacey, B. A., B. D., (Lombard), Teacher, Pasadena, California.

Richard Lamar Drane, B. S., Chief Draughtsman, G. V., G. & N. Ry., Tucson, Arizona.

George Mark Evans, LL. B., (Michigan), Ph. B., Teacher, Santa Ana, California.

Leslie Alexander Gillett, B. S., (Mining), Draughtsman, Surveyor General's Office, Phoenix, Arizona.

Georgia Ann Holmesley, Ph. B., Teacher, Clifton, Arizona.

Edward Horton Jones, B. S., Assayer, Magdalena, Sonora, Mexico.

John Williard Prout, Jr., B. S., Superintendent Mowry Mine, Patagonia, Arizona.

Thomas Edward Steele, B. S., Assayer, La Cananea, Sonora, Mexico.

1904.

William Burnham Alexander, B. S., Civil Engineer, Tucson, Arizona.

Elbert John Hollingshead (Kimble), B. S., Los Angeles, California.

Frank Caleb Kelton, B. S., Instructor in Civil Engineering, Tucson, Arizona.

Estella Markham Prout, Ph. B., Denver, Colorado.

John Williard Prout, Jr., B. S., (Mining). See 1903.

1905.

Ora Elinor Norway, Ph. B., Patton, California.

1906.

Advanced Degree:

M. S., William B. Begg, A. B. (Toronto).

Chester Bennett Clegg, B. S., (Civil Engineering), Draughtsman, Roosevelt, Arizona.

John Wesley Gebb, B. S., (Mining), Silverbell, Arizona.

Roy Bartley Kilgore, B. S., (Mining), Seattle, Washington.

Roy Gibbons Mead, B. S., (Mining), Los Angeles, California.

Roy Webb Moore, B. S., (Mining), Tucson, Arizona.

Carobel Murphey, A. B., (Cox College), Ph. B., Teacher, Tucson, Arizona.

Ida Christina Reid, Ph. B., Instructor, University of Arizona, Tucson, Arizona.

Minnie Louise Wooddell, Ph. B., Teacher, Tucson, Arizona.

1907.

Advanced Degree:

Engineer of Mines, John Willard Prout, B. S., B. S., (Mining.)

Charles Alexander, Ph. B., Teacher, Tempe, Arizona.

Harriet Estella Brown, Ph. B., Teacher, Tucson, Arizona.

Lawrence Brodhead Croasdale, B. S., (Mechanical Engineering), Draughtsman, Tucson, Arizona.

Weda Ina Purcell, Ph. B., Teacher, Tucson, Arizona.

Hugh Maupin Wolflin, B. S., University of Arizona, Tucson, Arizona.

MILITARY ORGANIZATION

1907-8

UNIVERSITY OF ARIZONA CADET BATTALION. NATIONAL GUARD OF ARIZONA.

Commandant of Cadets
Lieutenant Samuel V. McClure, U. S. A.; Major,
N. G. A.

STAFF.

Adjutant First Lieutenant John H. Culin
Sergeant Major Howard W. Estill

COMPANY A.

Captain Leslie C. Millar
Acting First Lieutenant John H. Culin
Second Lieutenant..... Charles A. Button
First Sergeant... J. Malcolm Henry
Sergeant J. Urbano Salazar
Sergeant Ben H. Clark
Corporal Sidney R. Jones
Corporal Homer B. Batte
Corporal George Nishihara

COMPANY B.

Captain Warren A. Grossetta
First Lieutenant Rollin Brown
Second Lieutenant Ernest O. Blades
First Sergeant Alvan C. Gillem
Sergeant Charles A. Firth
Sergeant R. Jackson Weeks
Corporal John C. McClure
Corporal Charles Roletti
Corporal Kenneth B. Brown

TRUMPETERS.

Sergeant Sidney F. Mashbir
Corporal Julian Huddleston
Private Oney Anderson
Private Ralph Rigg

COLOR GUARD.

Color Sergeant H. Oliver Coles
Color Sergeant Guy Emmons
Acting Corporal D. Leslie Wooddell
Acting Corporal William R. Campbell

At the annual Military Competitive Drill, June 1907, Cadet Howard W. Estill won the University medal in the individual competition.

REGISTER OF STUDENTS

GRADUATES.

Carpenter, Miles Miller, B. S., Texas Agricultural College,
 Tucson
 Edelsteen, Karl Johan, University of Kristiania. . . Tucson
 Orr, Samuel James, B. A., University of Colorado. . .
 Boulder, Col.
 Stebbins, Lillian Brownell, B. A., University of Minneso-
 ta Tucson
 Whiting, Edward Blake, B. S., Yale University.
 New Haven, Conn.
 Whitwell, Mrs. Florence Nye, Columbia University. . Tucson

SENIORS.

Bradstreet, Carroll Pitkin New York City
 Chapin, Theodore Flagstaff
 Dinsmore, Benjamin Scott Tucson
 Tarr, William Arthur, B. S., Oklahoma Agricultural and
 Mechanical College Tucson
 Worthing, Leigh Ernest Traver, Mich.
 Welflin, Hugh Maupin, B. S., University of Arizona. . Tucson

JUNIORS.

Burnham, Roderick Deane Pasadena, Cal.
 Harwick, Ralph N. Buffalo, N. Y.
 Hatcher, Burrell R. Douglas
 Henderson, John Harry Arkadelphia, Ark.
 Johnson, Orville Morris Lincoln, Neb.
 La Baree, Grace Ysabel Tucson
 Macauley, Frederick Robertson Montreal, Canada
 Osborn, W. Scott Phoenix
 Post, Anita Calneh Yuma
 Ruthrauff, John Mosheim Tucson
 Thompson, Arthur Perry Phoenix
 Wilkerson, Mabel San Bernardino, Cal.

SOPHOMORES.

Barnes, Frank Eugene Morris City, Ill.
 Behr, Ernest Edward Pasadena, Cal.

Blades, Ernest Orrin	Roosevelt
Calloway, Lawrence Arthur	Tucson
DeFoe, Arthur Douglas	Bay City, Mich.
Doan, Fletcher Morris, Jr.	Tombstone
Grossetta, Warren Arthur	Tucson
Hoyt, Joseph Clyde	Jerome
Newton, Raymond Austin	Patchogue, N. Y.
Sanford, Chard Oliver	Los Angeles, Cal.
Tarr, Coralynn Gertrude	Tucson

FRESHMEN.

Doty, John, Jr.	Richmond, N. Y.
Farish, Thomas Edward	Phoenix
Foster, George S., Jr.	Tucson
Harrison, Ralph Waldo	Ashland, Wis.
Holmes, Laura	Tucson
Leslie, Beppie Lee	Tucson
Millar, Leslie Creighton	Tucson
Murphey, Elizabeth Ella	Tucson
Purcell, Ivy Mae	Tucson
Ratliffe, George Thomas	Tucson
Rider, Jane Herbst	Tucson
Rodgers, Pauline	Canaille
Rose, Frank Winfred	Livingston
Soule, Madeleine	Tucson
Steele, Willard Penn	Marshfield, C.
Strong, Leon Henri	Tucson
White, Edwin Henry	Cochise

UNCLASSIFIED—COLLEGE.

Bogan, Mrs. P., Philosophy, Spanish, Bookkeeping . .	Tucson
Brown, Clara Agnes, Spanish, Stenography	Tucson
Culley, Edith, Philosophy	Tucson
Douglas, Mrs. A. E., History, French	Tucson
Drachman, Myrtle, German	Tucson
Emery, Fannie, French.	Tucson
Fewell, Mary A., French, Latin	Tucson
Forbes, Mrs. R. H., French, Spanish	Tucson
Hochderffer, George, Botany, History	Flagstaff
Hochderffer, Mrs. Mary J., Botany	Flagstaff
Hooper, Ethel, Physics, Spanish	Berkeley, Cal.
Kitts, Mrs. Katherine, French, Spanish, Philosophy .	Tucson
Nutt, Anne, German	Tucson
Payne, Mrs. L. H., English, Spanish.	Tucson

Pease, Ione, Spanish	Tucson
Ryder, Frank, Chemistry, Geology, Mineralogy	Tucson
Smith, Jerome H., Jr., Economics, Spanish . . .	Lincoln, Neb
Wren, Ina Mae, Spanish, Music	Tucson

FOURTH PREPARATORY.

Angius, John	Bisbee
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Beck, Charlotte Ellen	Tucson
Bennie, Florence Mary	Clifton
Brown, Rollin	Tucson
Button, Charles Aca	Williams
Coles, Henry Oliver	Bisbee
Culin, John Harding	Tucson
Dorr, Claudius Goldman	Batesville, Ark.
Duffy, Alice Elizabeth	Tucson
Duffy, Harriet Loretta	Tucson
Edgerton, Ambrose Earl	Silver Plume, Colorado
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Estill, Howard Wilmot	Tucson
Firth, Charles Abraham	Aravaipa
Gillem, Alvan Cullam, Jr.	Fort Huachuca
Harwick, Claus Andrew	Buffalo, N. Y.
Mashbir, Sidney Freudenthal	San Antonio, Texas
McCloskey, Pearl Louise	Tucson
McDermott, Ora Martina	Tucson
McNeil, Clara May	Tucson
Nishihara, George Shikataro	Tucson
Pritchard, Stella M.	Tucson
Purcell, Marie Ella	Tucson
Maverick, Phillip Augustus	Tucson
Pusch, Henrietta Louise	Tucson
Rick, Leo Zeno	Tucson
Sine, Janet Volume	Tucson
Smith, Felicia Grace	Globe
Standeford, Charlton Greenleaf	Silverbell
Temm, Edward Byrne	Tucson
Trippel, Amy Irene	Tucson
Weeks, Robert Jackson	Greensburg, N. C.
Whitwell, Sturges Bigelow	Tucson
Wooddell, Florence Ella	Tucson

THIRD PREPARTORY.

Baker, Agnes Mary	Tucson
Barrows, Walter Almer, III	Sharpsville, Pa.
Bohannon, Mary Selene	Tucson
Brown, Kenneth Brooke	Tucson
Brown, James Lewis	Deming, N. M.
Cannon, Frank Mullen	Congress
Christie, Gerald Francis	Tucson
Clark, Benjamin Harrison	Benson
Cole, Carl Henry	Globe
Cole, Oscar	Tucson
Cook, Carrie Hampton	Tucson
Corda, Mamie Wilhelmina	Tucson
DeCorse, Benjamin Franklin	Yuma
Drew, Cecil L. L.	Mesa
Estabrook, Florence E.	Tucson
Goldbaum, Martha Anita	Tucson
Hawke, Viola.	Tucson
Henry James Malcolm.	Tucson
Henry, Lena Beatrice	Tucson
Horiuchi, Frank Shige	Yamashi, Japan
Huddleston, Julian	Tucson
Huddy, Viola Edith	Pearce
Jenkins, Alta Blanch	Los Angeles, Cal.
Jones, Sidney Raymond.	Tucson
Jones, Mary Virginia	Tucson
Lovejoy, Arthur Luccoch	Tucson
McClure, John Englebright	Tucson
McVey, John Hopkins	Youngstown, O.
Morales, Teresa	Tucson
Morgan, Ethel	Willcox
Pusch, Wilhelmina	Tucson
Rodgers, Helen	Canaille
Roletti, Charles John	Tucson
Shaw, Harry Downing	Cananea, Mexico
Simonds, Marie Theres	Hermosillo, Mexico
Smith, Charlotte Ellen	Globe
Soto, Lucretia	Willcox
Udall, Dorothy	Cerro Colorado
Wooddell, De Leslie	Tucson
Wuerdeman, Walter Henry	Cincinnati, O.

SECOND PREPARATORY.

Allison, Josephine	Tucson
Anderson, Oney	Tucson
Baffert, Filomeno Santos	Tucson
Barker, Anna Ruth	Tucson
Barnes, Eva McGill	Morris City, Ill.
Bogan, John Stuart	Tucson
Brown, Beryl Roberta	Tucson
Cameron, Alice Faith	Tucson
Campbell, William Riggs	Tucson
Carrow, Melvin Paul	Kingman
Cheney, Bernice Lynn	Long, Beach, Cal.
Cook, Nina Reese	Tucson
Cramer, Benjamin Earnest	Flagstaff
Culin, Frank Lewis	Tucson
Dicus, Ruby Maud	Douglas
Dutton, Charles Allen	Flagstaff
Engle, Edgar Ernest	Bisbee
Glasscock, Bernard Charles	Pasadena, Cal.
Goldbaum, Beatrice Belle	Los Angeles, Cal.
Hofman, Gladys Buela	Tucson
Hubbs, Wayne	Kingman
Hughes, Mary Annetta	Tucson
Ingram, Julian Courtenay	Tucson
Johnson, Erving Almon	Morenci
Kavanaugh, Rose Agnes	Tucson
King, Thomas Richard	Tucson
Kuencer, Walter Emil	Kingman
Lando, Leona Sara	Tucson
Leake, Dora Adair	Tucson
Long, Olive Windaline	Globe
McComb, Richard Raymond	Willcox
McReynolds, William B.	Tucson
Nichols, Louise Wichman	Tucson
O'Connell, Mildred Luiza	Tucson
Pusch, Mabel	Tucson
Reese, D'Earl	Douglas
Rigg, Ralph Lee	Tucson
Rogers, Frederick William	Tucson
Rolfe, Clifton Howard	Tucson
Salazar, Jose Urbano	Chihuahua, Mex.
Skinner, Ida Belle	Tucson
Soto, Ernest Steve	Willcox

Thomas, Louisa D.	Tucson
Udall, Gladys Madge	Cerro Colorado
Wilkinson, Grace Dalne	Tucson
Williams, Isaac Jackman	Congress Junction

FIRST PREPARATORY.

Abrams, Alma Marion	Naco
Bennie, Isabel	Clifton
Burgess, Ernest	Alsager, England
Cartier, Antoine E.	Silverbell
Cook, Louis J.	Tucson
Corona, Raymond Alfredo	Douglas
Emmons, Harriet	Pearce
Gaddis, Homer Baker	Kingman
Gillem, Jennings Frederick	Fort Huachuca
Greenlaw, Charles Allin	Flagstaff
Haby, Romeo	Klondike
Hart, Stadden Stimpson	Tucson
Hedges, Lawrence Seitz	Chattanooga, Tenn.
Henderson, Marguerite Hall	Arkadelphia Ark.
Hickey, Iris Love	Tucson
Hochderffer, Frank James	Flagstaff
Hunt, Samuel Leroy	Bisbee
Linsley, Richard G.	Tucson
Martin, Jack	New York City
MacDougal, Alice	Tucson
McKinney, Rufus Martin	Cochise
Newland, Joseph	Ardmore, Okla.
Pates, Ulie	Greenville, Tenn.
Prugh, Marie Jeannette	Greensburg, Pa.
Reiner, Olga Elgina	Madison, Wis.
Richards, David La Madrid	Altar, Mexico
Serrano, Albert P.	Altar, Mexico
Tierce, Homer	Bisbee
Willard, Chester Rolland	Cornville
Wright, Lyda Alberta	Alhambra, Cal.
Wuerdeman, Emil Knapmann	Cincinnati, O.

UNCLASSIFIED PREPARATORY.

Brown, Charles, O., English, Stenography, Spanish	Tucson
Cassiday, Clifford Harry, English	Tucson
Decker, Hazel, Stenography	Tucson
Galindo, Edwin Arthur, English, Chemistry	Tucson

Hedges, James Robertson, Mathematics, Chemistry	Chattanooga, Tenn.
Knowles, James E., Mathematics, Chemistry, Physics . .	Bisbee
Goldtree, Estella, German	Tucson
Neiswender, Chester Bernard, Chemistry, Mathematics .	Tucson
Pates, Willie Washington, English	Greenville, Tenn.
Patterson, James Clanahan, Stenography	Tucson
Peters, William Edward, English, Mechanic Arts	Cincinnati, O.
Rigg, Eva Lillian, English, Spanish	Tucson
Simpson, Jennie, French	Tucson
Wheeler, Anna Mae, Stenography, English . .	Seattle, Wash.
Wheeler, Charles A., Stenography, History	Tucson

SUMMARY.

	Male.	Female.	Total.
Graduate Students	4	2	6
Seniors	6	0	6
Juniors	9	3	12
Sophomores	10	1	11
Freshman	10	7	17
Unclassified, College	3	15	18
Total College	42	28	70
Fourth Preparatory	21	14	35
Third Preparatory	21	19	40
Second Preparatory	25	21	46
First Preparatory	22	9	31
Unclassified, Preparatory	9	6	15
Total Preparatory	98	69	167
Total for the University			237

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THE UNIVERSITY OF ARIZONA RECORD IS ISSUED FIVE TIMES A YEAR,
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APPLICATION PENDING FOR ENTRY AS SECOND-CLASS MATTER AT THE
POSTOFFICE AT TUCSON, ARIZONA.

THE RECORD INCLUDES THE FOLLOWING PUBLICATIONS:

The Annual Report of the President of the University to the
Board of Regents.

The Annual Register of the University.

The Announcements of the School of Mines, The Geological
Survey, and the Several Departments of Instruction and
Research.





UNIVERSITY OF ILLINOIS-URBANA



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